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FIFTEENTH YEAR.

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UTILIZATION OF WASTE GASES.

For many years past numerous experiments have been made, and various methods have been adopted for the purpose of collecting the gases evolved from blast furnaces, so that the large consumption of fuel might be economized, and the waste heat applied to a thoroughly profitable purpose. From time to time ingenious devices have been contrived, not only for heating the blast by this means, but also for applying these gases to the steam boilers, thus almost entirely doing away with the use of dross or small coal for raising steam and heating the blast, by which a very considerable saving has been effected in the cost of iron smelting. Notwithstanding these practical results, however, the improvements have only been slowly introduced, and have not yet been universally adopted. But there have been various reasons for caution in these matters. The adoption of the close-topped furnace has only been entered upon after the most careful investigation and the most severe test that it would prove a benefit to the iron trade. The obtaining of iron being the primary object in all the operations of the blast furnace, whatever alterations or improvements that are made, or attempted to be made, must in no way be allowed to interfere with the quality or quantity of the iron produced, and any alteration that might in any way effect this could only be adopted with the greatest caution. Among the highest authorities in the chemistry of iron smelting, very conflicting opinions appear to be held on this subject, some being of opinion that it is neither expedient nor desirable to control the escape of the gases, and that where the consumption of coal is proportioned to the requirements of the case, not one particle of gas, or one unit of heat can be withdrawn from a furnace without disturbing the equilibrium of the smelting; and perhaps the chief hindrance to the general application of the waste gases to heating purposes was the fact that their withdrawal necessitated an alteration in the economy of the furnace. Now, however, the close-topped furnaces have had a very fair and, it is believed, successful trial; and we have now to record that the utilization of these gases has been carried a step further by causing them to yield valuable products before they are burned to raise steam for the engines and heat the blast for the furnaces, and this is achieved without in any way interfering with the efficiency of the blast furnace or the ultimate use of the gases above mentioned. It has long been well known that one of the principal sources of the productions of ammonia has been the destructive distillation of coal, such as in the making of gas; and from the time of Pliny the manufacture of ammonia has been a prolific field for theoretical and experimental research. At various iron works, for some considerable time past, experiments on different scales have been made further to utilize the waste gases before burning them by extracting the tar and ammonia which were found to be present in the gases of all blast furnaces where coal was used as fuel, and we understand that at the Gartsherrie Iron Works, Scotland, the problem has been solved in a practicable form of extracting tar and ammonia from blast furnace gases without increasing the cost of manufacture or in the slightest degree disturbing the process of smelting. The successful carrying out of the operations to recover the tar and ammonia from blast furnace gases would assuredly place ironmakers in a far better position. We learn that the tar obtained at Gartsherrie is for many purposes quite equal to ordinary gaswork tar and that the ammonia is of the very finest quality.

THE IRON TRADE.

The collapse of the most extensive and longest strike on record—three and a half months—must necessarily exert an important influence on the iron trade. Its effects having been to some extent discounted, it has so far exerted but a slight influence on prices of pig iron—favorite brands, which are scarce, ruling firm for prompt delivery; but the tendency of other makes is in buyers' favor. The starting up of the western mills has increased the production of finished iron, but the additional inquiry for raw material is being met by the increased output of furnaces that have recently gone into blast. While the bar trade continues light there is considerable inquiry for tank, skelp and boiler plate,. There is an active demand for wrought iron pipe. For old rails there is some inquiry and the market is reported firm both in this country and in England. An increased demand is springing up for steel rails. Railway spikes are still unchanged. Stocks of wrought scrap is limited, and prices fully maintained.

As the British markets rule those of this country, and prices in these rule low, no advance in pig iron is to be looked for. The only improvement that could come to our Ohio furnacemen would be in the reduction of the cost of Lake Superior ores which are out of proportion to the selling prices of pig iron in our Western markets. The determination of the Scotch ironmasters to continue to curtail supply is due not to any expectation of advancing prices, but to avert a decline in face of present large accumulations. Notwithstanding the restriction of make in two of the most important districts of Great Britain, there is no evidence that the total stocks of that country have been reduced, and the home and foreign demand during the last six months has been sufficient to absorb the whole production without making an inroad into the heavy stocks held.

SCIENCE IN THE WORKSHOP.

When mechanics as a general body become more thoroughly impressed with the conviction that the way to advancement both as to personal position and monetary returns lies through the mastery of science in the application of principles to their daily work, we may anticipate some joint movement on their own part to establish means for acquiring technical knowledge. Any such movement in Cleveland would, we are satisfied, secure the support of manufacturers. We might multiply examples of the benefit of courses of scientific training. The proper understanding of the laws of expansion and contraction as applied to many castings, and even to the wrought iron and steel industries, would prevent much waste in the foundry and at the forge from the effect of unequal expansion and contraction, and also occasion fewer inequalities in the quality of that supposed treacherous material, steel. It would also prevent many mishaps to boilers, engines, and their accessories in cold weather. A knowledge among workmen of the principles of inertia, as affecting bodies in motion, would frequently prevent a breakdown in starting or stopping machinery suddenly. For all connected with blast furnaces, the value of chemical knowledge is apparent, as enabling them to trace the cause of faulty results. There is scarcely a workshop of any importance in which an acquaintance with geometry will not be of value. In short, the value of science asserts itself every hour in the workshop. The scientific mechanic never falls into ruts either of thought or habit. Working more intelligently than others, he finds more pleasure in his labor; his suggestive faculties are ever at work, and he is ever alive to the possibility of mechanical improvements, from which he may reap a handsome reward. The manufacturers who have risen from the bench without acquaintance with technical science constantly feel themselves at a disadvantage. As all branches of science hold some relation to each other, the acquisition of any one portion of these will prove of value to the workman whatever his vocation.

GAS IN THE FUTURE.

There is a good deal of sound sense in Dr. Siemens' view, as expounded before the British Association, that despite electricity, gas has a yet greater future before it. There is, for instance, the gas engine. According to Dr. Siemens. the best steam engine yet constructed does not yield in mechanical effect more than one-seventh part of the heat energy residing in the fuel consumed, whereas the factor of efficiency of the gas engine is one-quarter. If, therefore, it shall be adapted to vessels, the gas engine being of half the weight of the present steam engine and boilers, and working with only about half the present expenditure of fuel, it will admit of an addition of 30 per cent. to the cargo of "an Atlantic propeller vessel—no longer to be called a steamer." That improvement accomplished the balance of advantages in favor of such vessels would be sufficient, as he says, to restrict the use of sailing craft chiefly to the regattas of yachtsmen. The great advance hitherto made in the steam engine has been in the direction of saving fuel; the use of gas instead of steam will allow of a much lighter engine, and save space, besides costing less in working. The time is probably not far distant when coal will disappear from everywhere but the gas house.

OUR FOREIGN TRADE.

The new batch of Consular Reports issued by the Department of State is replete with suggestive hints to manufacturers who are seeking to push business abroad for their productions. Consul Mason of Basle, Switzerland, states what is applicable to other foreign countries when he observes: "As a principle, the introduction of American manufactured products into Switzerland can be accomplished only by the same means that are employed for a like purpose at home. The goods must be advertised, intelligently exhibited, sub mitted to purchasers for inspection and trial—in a word, the business, whatever it is, must be pushed, as Americans are accustomed to push their trade at home, and in whatever foreign countries they have obtained a footing. Agents who speak French and German, and who are familiar with Swiss notions and methods of doing business, should be sent here to exhibit samples and solicit orders. When such orders are secured, they should be filled promptly and with perfect good faith as regards quantity and quality. The bad effects of some unfortunate precedents in this respect will have to be lived down, but this can be done if the effort is made in the right way. Agents who come to represent American houses should be able to give prices at which the goods can be landed at the

nearest seaports, viz.: Antwerp, Havre, Rotterdam, Bremen, and Genoa." Foreign merchants naturally prefer to have the contingencies of ocean transportation eliminated as far as possible from their commercial calculations. Many of our manufacturers would find their advantage in consigning experimental invoices of their wares to foreign dealers, taking care to fill promptly any orders received. Further, there is a need on the continent of Europe of their dispatching circulars couched in the native language of the country to which they propose to supply goods to order.

PRESENTATION TO A CLEVELAND MANUFACTURER.

On Monday afternoon last, the employes of the National Machinery Co., manufacturers of bolt and nut machinery, presented to Mr. W. R. Anderson, the secretary of the company, a superb gold time-piece. As the works of the company are shortly to be removed to Tiffin, O., where new buildings are in course of construction, which will afford increased capacity for its rapidly developing business, the circumstance was considered by the employes as affording a fit occasion for testifying in a substantial manner their personal regard to Mr. Anderson, with whom for a lengthened period of time they have maintained the most cordial good will. The preconcerted shutting down of steam at 12:40 p. m. was the signal for the men assembling on the first floor of the works, and an intimation having been conveyed to Mr. Anderson that the men had suspended work, he proceeded to the building. Mr. Osterhaut, manager of the wood department, as spokesman for the employes, stated that in view of the approaching transfer of the works to Tiffin, they desired to give an expression of their regard, embodied in a time-piece with suitable inscription. The harmonious relations that all along had been maintained were symbolized in the perfect adjustment of the parts of that time-piece, he being the mainspring of the organization. He had only to add that they wished him increased prosperity in time to come. The watch, a most costly one, having been duly presented, Mr. Anderson, who had evidently scarcely recovered from his surprise, said that affairs had taken a quite altered turn from what he had been led to expect by the abrupt message delivered to him. He fully appreciated and heartily reciprocated the kind feelings expressed by them, and of which that watch was the token. The proceedings here terminated. The watch is a *chef d'œuvre* of art,—the workmanship of the celebrated time-piece manufacturers, E. Howard & Co., Boston. It has an 18 carat box case of the Louis Quartorze style. The works are allowed to be unexcelled in excellence, whilst the case is not only the finest made by that establishment, but is unapproached in workmanship by any produced by the watchmakers of this country, of England or France.

STEEL CASTINGS.

Elsewhere we furnish an account of an alleged improvement in steel casting invented by Mr. George Cowing, of Cleveland, and owned by the Cowing Steel Casting Co., of this city. It is affirmed by the inventor that not only can propeller shafts, walking beams and most of the principal parts of the steam engines be made with the accuracy of casting and the strength of mill steel, but the production of many of our rolling mills can be greatly increased by reason of the increased strength of parts possible by the use of the new product. The substantiality of this claim necessarily awaits extended test. If confirmed together with the further claim that soft steel castings of this class can be employed in the construction of heavy blooming mills, the invention will prove most important. Cast steel has been used for its comparative cheapness, not with any idea that it was equal to mill steel, its inferiority in strength leading to numerous accidents. Again, in the pressure on mill owners, engineering and other works for the execution of orders, the comparatively little time required for the execution of orders, it not being necessary to anneal the castings, will constitute an important industrial gain.

THE Committee on Screw Threads of the Master Car-Builders' Association has issued a circular calling attention to the importance of uniformity in the use of screws of bolts and nuts, a uniformity only to be secured by a correct standard, and to the great evil which results from the use of what are called over-sizes of screws. The Association deprecates the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute system.

THE variety of goods exported from this country to Mexico, as enumerated in a recent consular report, is somewhat astonishing, showing that Ohio might profitably have her hand in the growing trade of our sister republic. Considerable reductions have already been made in Mexican import dues and internal carriage, and with the new commercial treaty to be arranged and railway extension we may fairly look to an immense development of trade with that country.

THE prosperity of the Connotton Railway line is a matter of gratification. The new branch, which is said to be of greater earning capacity than the main line, is being pushed and is expected to be in operation by December. A splendid move in favor of the Connotton is the appointment of Mr. Sam Briggs, in whom the Valley Railroad executive lose a powerful coadjutor.

MANUFACTURES.

TO MACHINISTS, MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sending to press.

OHIO INDUSTRIES.

CLEVELAND.

THE blast furnace of the Cleveland Furnace and Iron Co. is again in operation.

THE Refined Petroleum Product Co. has been incorporated with a capital of $30,000.

BOWLER & Co. have lately enlarged their foundry, nearly doubling their capacity for making car wheels. They have also put up a new shop 50x80 ft., for fitting wheels on axles.

LAPHAM & Co., Cleveland Wooden Ware Co., 94 Leonard street, have put into the market fifty per cent. more goods this year than in the corresponding period of 1881, having at the same time increased the product of their works. The principal products of the establishment are pails, tubs, churns, and washboards.

THE proprietors of the Clifford Architectural Iron Works, 30 South Water street, manufacturers of iron fences, gratings, stairs, roof crestings, finials, stable fixtures and hitching posts, are doing an increasing business, and prospects good for a heavy fall trade.

J. NOYES SMITH & Co., 59 and 61 South Water street, manufacturers of machinery, machine bolts, nuts, washers, &c., have made extensive additions to their establishment for the making of bolts and nuts. Everything is in full blast and the fall trade looks well.

THE Powell Tool Co. have recently commenced operations in their new shop, and are able to produce 50 per cent. more goods than formerly. They now occupy an entire block and have an axe and forge shop 227x66 feet and 50 feet high. The power for running their machinery is furnished by a 48x26 Corliss engine.

WHAT New England is in the East, Ohio is in the Mississippi valley—the central point for mechanical production. The machinery of New England is of a ligher, finer, more delicate character; the cotton and woolen and silk mills are New England, as are the watch tools, the fine lathes, the cutting tools and the appliances for fine light work. New England is the canny workman of the world. Ohio is the representative of the new, ponderous, massiveness of the mountains, the prairies and the broad fields, the mighty streams and the swedging and rolling of gigantic machines for gigantic enterprises. When the census is published, if ever it is, Ohio's industrial place will be an astonishment no less to herself than to the States east of her. No State has a greater diversity of industry, none excels her in very many of the most important appliances of the new industrial development. If the West wants mowers, reapers and harvesters she comes to Ohio; if she wants water-wheels and wood-working and flour-mill machinery she turns to Ohio as well. So in engines, and turbines, and pumps, and iron and steel of the most varied character and for the most varied uses, in fact the accumulation of wealth in populous industrial towns, like Cincinnati, Cleveland, Dayton, Springfield, Columbus, Hamilton, Youngstown, Sandusky, Canton and at least fifty other towns is simply astonishing. Each one of these towns is a name for standard excellence in special production, and gives value to the surrounding country.—*Chicago Jour. of Commerce.*

THE firm of Robinson Bros. & Co., Akron, manufacturers of celebrated Akron stone sewer pipe, was established February, 1881, and their works were built expressly for sewer-pipe manufacturing and possess facilities unequalled for quantity, as well as for the manufacture of 200 different kinds of pipe. The species of clay used is peculiarly adapted to this work on account of its susceptibility to vitrification, as well as the process of glazing, which combines with the clay and forms an impenetrable lining, which is neither affected by the contact of acid, gases nor steam, which causes the glazing to check and crack. The grounds cover an area of over twelve acres, and coal lands 150 acres, and the capacity of the works is five car loads per day, and still they cannot fill all their orders. They intend building two more clay mills and putting in another boiler. They have now two stacks built for two more kilns. This company has most excellent facilities, as the Valley Railroad, Cleveland, Akron & Columbus Railroad, and the New York, Pennsylvania & Ohio Railroad all run within one hundred yards of the works, and are connected by switches in their yards. The trade of this house extends all over the United States, but Chicago is one of the principal points.

RIEHLE BROS. report orders coming in as very encouraging; among recent ones including a 50,000 lb. "Standard" testing machine for C. S. Maltby, Millerton, N. Y., and a machine of same capacity for Holyoke Machine Co., Holyoke, Mass.; 15,000lb. cement tester for the Department Public Works, New York city; 5000 lb. transverse tester for Messrs. T. Schriver & Co., New York; 2500 lb. transverse tester for Fales & Jenks, Pawtucket, R. I.; also railroad track scales for Jessup & Moore Paper Co.; furnace charging scales for Jagger Iron Co., D. O. Hitner, C. W. Ahl & Son; also large scales for the Plymouth Rolling Mill Co., Conshohocken, Pa., Logan Iron and Steel Co., Atkins Bros., Reading Iron Works, and many others.

AMONG new companies organized are the Cleveland Electrical Manufacturing Company; capital stock, $150,000. Empire Manufacturing Co., Cleveland; capital stock, $50,000. The Wapakoneta Gas Light Company, Wapakoneta; capital stock, $15,000. The Burchell Iron Company, Ashtabula, capital stock, $25,000. The Toledo Glass, Sand, and Railway Company, Toledo; capital stock, $100,000; Revolving Sulky Rake Co., Gallion, capital stock $50,000; Cambridge Gas Light Co., Cambridge, capital stock $20,000; Buckeye Telegraph Co., Middleton, capital stock $60,000; Superior Bolt Clipper and Pump Co., Miamisburg, capital stock $20,000.

THE new pottery of Broome & Morgan, to be

known as the Dayton Porcelain Pottery, Dayton, is now completed, and the first kiln of ware will be burned in the beginning of October. The pottery is complete in all its details, and possesses an ample stock of all the appliances and machinery incident to the business. The motive power consists of one Corliss 60-horse power engine, from the works of Brownell & Co., Dayton. The firm will manufacture full lines of fine porcelain hotel ware. The only other pottery of the kind is at Greenpoint, N. Y.

THE Western Nail Co., the new institution at Belleville, is now operating 42 nail machines, and are having built six new 10d machines at Pittsburgh and eight new 4d and 6d at their own works—all to be completed by the 1st of November. This will increase their product to 3,000 kegs per week. W. L. B. G. Allen, of this city, has put into the factory building a 3-light Brush electric machine, which is in successful operation. The new works are running smoothly, and only a few feeders are wanted. The demand is ahead of the capacity.

THE Alpaca Mills, Kent, are running to their fullest capacity, and turning out large quantities of goods for which the firm finds ready sale; in fact they are unable to keep up with their orders. Four runners are on the road in the interests of the mills. All the looms, 63 in number, are running, many of which are operated by Kent girls who have become expert weavers and make good wages. The firm is buying large quantities of wool, the ruling price being 31 to 34 cents per pound.

THE Cuyahoga Steam Furnace Co., established 1834, have turned out large bed-plates and heavy wrought iron shafts for two blast engines being built for an Alabama furnace; also a 2,000-lb. steam hammer for an Indiana iron works, together with new patterns and castings for two new style steam hammers for the Louisville, Ky., steam forge. Enormous air or blowing cylinders are being constantly produced at these works.

THE Ward Iron Co. have received additional car loads of heavy machinery for their new rolling mill at New Philadelphia, including a large double engine. Work on the new mill is progressing rapidly, and the superintendent thinks they will be ready to kindle fires in October. These works will be the largest in Eastern Ohio.

THE Akron Iron Co.'s rolling mill has its capacity enlarged by the expenditure of $35,000 to $40,000. It has a working force of 325 men, and the monthly pay roll is $20,000. The increase in capacity is all in the direction of hot polished shafting, the production of which is being doubled.

KERR BROS. & Co., Hicksville, have started up with new Henessey patent triple draft boilers, set in Jarvis furnace, with Jas. F. Hotchkiss' mechanical boiler cleaner, Hall's patent spray feed water purifier, and the Stilwell & Bierce feed water heater and purifier.

THE Canton Car Co. have lately secured large contracts for cars, among which is an order for 500 cars for the Wisconsin, Iowa & Nebraska Railway. The company have shipped 30 box cars to Orrville, for the Cleveland, Akron & Columbus Railway.

THE new nail works at Mingo, a suburb of Steubenville, have been completed, and the machinery satisfactorily tested. The works have accommodation for 120 nail machines, but only 100 at the outset will be put in operation.

THE Massillon Bridge Co., Massillon, has taken a contract for a combination bridge, 400 ft. long, over the Scioto River in Columbus, for the Indiana, Bloomington & Western.

THE capital stock of the Spaulding Iron and Nail Co., at Brilliant, has been fixed at $300,000, of which $150,000 is subscribed by Mr. Spaulding.

THE mills at Ironton are driving ahead, double turn, and have all they can do, shipments being made as rapidly as the iron can be turned out.

THE new Spaulding mill at Brilliant is under way and will be rapidly pushed to completion. The works are larger than those at Mingo.

MR. W. M. SHOOK, Canton, is at present remodeling the "Plain Center Mills" at Plain Center, putting in entirely new machinery.

THE new Champion Machine Works, at Springfield, will have a capacity of one machine per minute, and employ 2500 men.

POINT Savage Fire Brick Works, at Mineral Point, have been enlarged, a steam elevator put in, and new coal and clay mines opened on the property.

THE buildings of the Youngstown Steel Co. will be completed and commence the making of steel castings in five weeks.

JAMES WARD expects to have his new rolling mill at New Philadilphia ready to make iron by December 1st.

THE new locomotive works, at Garfield, will be be completed in three or four months. The buildings will cost $102,000.

THE Superintendent of the Alice furnace, Ironton, expects to increase its capacity to 80 tons daily.

MESSRS. J. F. and Monroe Seiberling, are developing coal lands south of Canton, and meet with good success.

OHIO'S farm products in 1880 were valued at $190,256,000. Her manufactures at $267,700,000.

THE Buckeye Works, Akron, will soon run 100 machines per day.

CINCINNATI parties are prospecting for a varnish factory in Akron.

THE Akron Sewer Pipe Co. is building a new kiln.

INDUSTRIES IN GENERAL.

MAINE.

AN important industry in Maine is the working of the sandstone quarries at Portland. They cover a large amount of territory, employ hundreds of hands, and their yearly shipments are very large. One quarry has now in hand the shipment of 14,000 tons of this stone to Chicago.

A NEW wood-pulp company, with a capital of $200,000, which is going into the manufacture of chemical pulp, has been organized under the name of the Penobscot Fibre Company. Its works are to be located a few miles north of Bangor.

MASSACHUSETTS.

THE N. Y. Providence & Boston R. R. Co. are putting in two improved bucket plunger steam pumps, made by the Valley Machine Co., at Easthampton, to replace two of the same make that have been in use twelve years.

THE Springfield Foundry Co., Springfield, have increased their capacity by adding a new cupola.

THE Cheney-Bigelow Wire Works, Springfield, have secured additional room in which they have placed new looms for weaving wire cloth and new wire drawing machinery.

THE Lowell Print Works, Lowell, have resumed operations after having been closed for some six months. The works have three machines with a capacity of 1500 pieces a day.

NEW HAMPSHIRE.

THE Sullivan Machine Company, Claremont, are getting out $23,000 worth of machinery for the manufacture of asphalt pavement. This machinery will be shipped to Sydney, Australia.

THE soap stone works of Eaton & Williams, Nashua, are running night and day. The waste pieces of soapstone are utilized by being ground into a powder for a hard finish for plaster.

RHODE ISLAND.

THE new American File Co., Pawtucket, employ 200 men and have a capital of $500,000. A 250 horse power Harris-Corliss engine drives the machinery, a smaller engine being used for the machine shop. There are employed at this establishment 21 power hammers, comprising 11 Bradley hammers, six ordinary trip hammers, three Belden hammers, and one Grant hammer. These hammers have a capacity of 1050 dozen per day.

GOV. HOWARD and Pardon Armington, of the Armington and Sims Co., Providence, have started for Europe on business connected with Armington and Sims engine. The right to build the engine in France has been sold.

CONNECTICUT.

DWIGHT SLATE, Hartford, has increasing calls for his adjustable lathe tools for cutting-off purposes. He is adapting the method to screw-cutting and diamond pointed tools. A recent demand for his shaving and slotting machines for screw heads has crowded his rooms, so that he is intending to extend his shop area.

THE following companies have been organized since June: The Francis Manufacturing Co. of New Britain, for the manufacture of hardware, capital stock $25,000; the Hartford Iron Works Co., capital stock $25,000; the Yale Automatic Brush Co. of New Haven, for the manufacture of automatic or self-feeding brushes, capital stock $2,500; the Foster Hardware Co., Meriden, capital $30,000; the Bridgeport Malleable Iron Co., capital increased from $30,000 to $100,000; the Babcock Printing Press Manufacturing Co., New London, capital stock $20,000; the New Haven Novelty Co., capital $5,000; the Flury Cutlery Co., Bridgeport, increase of capital to $150,000; the Ingersoll Manufacturing Co., Stamford, for the manufacture and repair of machinery, capital stock $6,000; the J. A. Canfield Co., Middletown, for the manufacture of rubber goods, capital stock $10,000; the Rockford Woolen Co., Middletown, capital stock $25,000; the W. G. & A. R. Morrison Co., Windham, for the manufacture of machinery, capital stock $50,000; the Hotchkiss & Upson Co., Farmington, for the manufacture of nuts and bolts, capital stock $120,000.

THE Hamer & Forbes Co.'s paper mills at Burnside, which have been closed for repairs, have resumed work. A new water-wheel has been put in and extensive repairs made in the mills in the meantime.

THE Norwich Nickel Works, Norwich, are doing a larger business than ever before, and, at the same time, have facilities for doing business promptly and effectively, features that are not excelled by any similar concern in this country. They are at present doing a very large amount of pistol and gun work.

THE fire which occurred on the 12th inst. on the premises of Sweetland & Co., manufacturers of the "Sweetland Chuck," New Haven, has not interfered with their manufacturing department. The losses having been adjusted, the works are in full operation, allowing of orders being promptly executed.

NEW YORK.

THE old Utica Foundry was established in 1822. The present proprietors are H. Gilbert Hart and T. F. Budlong. Iron castings of all kinds are made. The firm employ 32 men, and is one of the rapidly rising concerns of the city, business being managed on a liberal scale and the work giving entire satisfaction.

MR. PHILO S. CURTIS, Utica, proprietor of the Utica Steam Engine and Boiler Works, 214 Whitesboro street, has been engaged for the past 35 years in the manufacture of steam engines, &c. He also does a large jobbing business in machinery, employing from 80 to 90 men.

THE Delamater Iron Works occupy a space extending from Tenth avenue to the North River facing on Thirteenth street. Twelve hundred men, well skilled in their work, are employed by the firm.

PENNSYLVANIA.

THE Penn Hardware Co., Reading, have occupied their new foundry and finishing shops. The old works, where 150 men are employed, will be kept running as usual. In the new building they will employ 75 additional hands, making 225 employes in all.

MESSRS. Duncan & Baldwin, stove manufacturers, Pittsburgh, have purchased a large lot in Newcastle, where they propose erecting a foundry, 200 x100 feet; a finishing shop and warehouse, 175x50 feet and four stories in height, besides all the other storehouses, sheds, outbuildings, &c.

THE Lewis Foundry and Machine Works, Pittsburgh, are very busy, having orders for mill machinery, etc., several months ahead.

A NEW management has assumed control of the Allentown Rolling Mill, Allentown, and will manufacture girder and beam iron and steel rails.

THE Republic Iron Works, Pittsburgh, will start as early this season as possible, will employ about 250 men, and will manufacture pipe and boiler tube iron.

A Pittsburgh firm not long ago filled an order from an Eastern firm for ten tons of steel for the side pieces of spectacle frames. Some kinds of fine steel sell as high as $5 per pound.

THE Pittsburgh Steel Casting Co. have just completed a large blowing mill, the main building covering 120x180 feet. It is intended to utilize in it the large product of the Bessemer plant of the company.

LEISHMAN, Gordon & Snyder, purchasers of the Glenwood Steel Works, are manufacturing open hearth steel blooms, slabs and ingots.

THREE of the principal industries of Pittsburgh, viz.: iron, glass and steel, give employment to 34,702 persons. The cash capital invested $4,065,000, and the value of their products in 1881 was $64,250,269. The total value of the manufacturing and commercial industries of the city for this year, according to an estimate just completed, will be $620,000,000.

CARNEGIE BROS. & Co., limited, Pittsburgh, produced 9,000 net tons of spiegeleisen last year, and the Cambria Iron Co., of Johnstown, made 7,769 net tons.

MARYLAND.

H. A. RAMSEY & Co., Baltimore, are manufacturing sugar mills for Mexico, and also working on a contract for water works for St. Louis, Mo., for $150,000. When completed, in place, transportation and all, will cost $205,000.

ILLINOIS.

THE Aurora Smelting and Refining Co., Aurora, are placing two 40-horse-power boilers and new machinery in their works.

THE Joliet Wire Co., St. Louis, having recently sold out their business to the Ashley Wire Co., of Joliet, the last-named company are improving the works by the placing in of $10,000 worth of machinery, including a 300-horse-power engine, as well as a battery of four boilers. They will manufacture all sizes of steel wire, and employ 125 men. The capacity of the works will be three carloads a day and by October 1st the works will be in full running order.

THE Chicago Lock Co., Chicago, a new enterprise, will leave their present quarters. The company have purchased the old watch factory buildings, and, when in full running order, will employ about 200 men.

PRESIDENT Hegewisch, of the United States Rolling Stock Co., says his company has decided to locate its immense car shops near South Chicago. Their construction will be commenced at an early date. One thousand five hundred men will be employed in the shops, which will turn out twenty freight cars a day. It is expected that the company will spend $3,000,000 a year in the region.—*Chicago Indus. World.*

THE Chicago Forge and Bolt Co., of South Chicago, have just added to their blacksmithing department a 100-pound steam hammer for light work. The framing of the new building for the nut department of these works is up.

THORNBURGH & Glessner, Chicago, have taken the contract for all the elevating and conveying machinery, pulleys, shaftings, hangers, couplings, gearings, belting, etc., to be used in the new 200-barrel roller mill being erected at Colchester, Ill. This mill will contain all the latest improvements in milling machinery, and be one of the finest mills in Central Illinois.—*Chicago Indust. World.*

MICHIGAN.

THE three stove manufactories at Detroit melt 120 to 150 tons of iron per day, and the total business of a year amounts to upward of $1,000,000.

THE Standard Stamping Co., St. Louis, have completed the erection of machinery in their new addition, and are now prepared to meet orders with largely increased capacity.

THE Grand Rapids Furniture Co., of Grand Rapids, has begun the erection of an addition to its finishing department, 40x60 feet in size and two stories high.

WORK is progressing on the new factory of the Folding Chair and Table Co. at Grand Rapids. The building will be 100x50 feet frame, and will be completed this fall.

MISSOURI.

THE St. Louis Stamping Co., St. Louis, are running their mills full time. They are turning out a larger quantity of galvanized iron than at any other time of equal length in their history.

THE St. Louis Iron Fence Works have increased their working force about 20 per cent.

THE Mississippi Glass Works' new furnaces, St. Louis, are completed.

KENTUCKY.

THE Norton Iron Works have made extensive repairs and increased the capacity and efficiency of their nail factory. They will employ 150 men.

RAILROADS.

THE Connotton is to be changed to a standard guage.

OFFICERS of the Wabash system say they are now earning half a million dollars a week.

THE Lake Shore passenger business at present is larger than ever before, not excepting the Centennial year.

A NEW railroad is being agitated to run from Sandusky through Milan to Norwalk. to be under control of the Nickel Plate.

NEGOTIATIONS are now pending looking to the extension of the Cincinnati, Hamilton & Dayton lines by combinations and agreements with connecting roads, to the principal centres of trade in Illinois.

THE grading has been commenced on the Lake Erie, Wooster & Muskingum Valley road. The road is to run from Wooster, O., north to Burbank on the New York, Pennsylvania & Ohio, and will be 15 miles long.

CONNOTTON extension track layers have passed Navarre and have already reached the crossing of the Cleveland & Tuscarawas Valley Road at Justice. The road runs through the town of Navarre and touches Justice, Beach City, Durdee, Shanesville and Rowville, before reaching Coshocton.

TRACK laying on the Toledo, Cincinnati & St. Louis has advanced from Berlin, Jackson county, O., through Winchester, Madison Furnace and Oakland 15 miles, to a point between last named station and Gallia furnace in Gallia County. Total laid, 17 miles, from junction with present Southeastern Division at Wellston. The grading is finished on the entire line, 38.66 miles.

THE Valley Railroad Co. have completed arrangements with the Wheeling & Lake Erie for the running of through trains to and from Marietta. The right of way has also been secured from Mineral Point, the present terminus of the Valley road, for the connecting link, which will be made at a point about 2,000 feet east of Zoar Station, where a large union depot will be constructed. The work of building this link will be commenced shortly, and it is expected that before the last of November through trains will be run from Marietta to Cleveland via Canton.

THE report of the Ohio Central for the first six months in 1882 as compared with last year shows; Gross earnings, 1882 $907,354.31; gross earnings, 1881, $336,142.61· Increase, $571,221.70, 166.9 per cent. Track is laid on the extension of this road from Corning, O., southward to Athens, 17 miles. The track is now being ballasted, and the regular trains will shortly be put on. Work is well advanced on the line from Athens south to Pomeroy on the Ohio River.

THE Wheeling & Cincinnati Mineral railroad is to extend from a point opposite Wheeling to Cincinnati, with branches from Senecaville, O., connecting with the Cleveland, Tuscarawas Valley & Wheeling road, from McConnelsville down the valley of the Muskingum river to Marietta. The line from Senecaville to Cumberland, O., known as the Eastern Ohio railroad, is now in operation, and the grading is completed for some distance beyond Senecaville. It is proposed to complete the grading to McConnelsville immediately, and then open a line from that point to the Baltimore & Ohio road, a distance of forty miles, which will be known as the McConnellsville division. By this plan the line will have the benefit of competition of northern and eastern outlets by the Cleveland & Marietta railroad from Point Pleasant to the Pan Handle route of the Pennsylvania railroad at Newcomerstown, and also by the Baltimore & Ohio road.

MANY New England builders contend that the wood joists, encased in plaster, are proof against any ordinary fire, and for many reasons are much preferred by them to the ordinary regulation fireproof iron joists. The joists are "stripped" on the outside, and over these strips irons are run, and on these the plaster is spread.

REVIEWS.

LIPPINCOTT'S MAGAZINE for October: Philadelphia: J. B. Lippincott & Co.

In this number of Lippincott fact and fiction are admirably blended. It opens with an article on "Norfolk, Old and New," showing how that city is at last beginning to profit by the advantages of its position, and is full of bustle and enterprise, extending its railroad communications and becoming one of the chief emporiums of the cotton trade and other industries of the South. Other contributions are "Fairy Gold," a story; "My Escape from the Floods," "A Fair Ascetic," a story; "My College Chums," "By the Sea," "On Tumble-Down Mountain," a story; "Bark Canoeing in Canada," "The Shocking Example," "Camping on the Lower Wabash," followed by a charming variety of monthly gossip.

WIDE AWAKE for October: Boston: Houghton, Mifflin & Co.

The October *Wide Awake* has most entertaining stories and sketches. The illustrations are excellent. The stories include "A Nap in a Cannon," and a first-class circus story. "Wild Flower Papers" maintain their interest. "The Trojan War," and "Lost Among Savages" will command the interest of boys. "A Suit of Homespun," explains, with its fifteen illustrations, some of the homely processes of making woolen cloth at home in early days. The article "A Boy's Workshop," and "Through a Microscope" are excellent. The first of a series entitled "Famous Duels" is commenced.

ST. NICHOLAS for October: New York: The Century Co.

St. Nicholas for the coming month abounds in attractions both of pencil and pen. A new volume is about commencing, which, as shown by the programme, will render it additionally attractive to the tens of thousands of households in which it is so welcome a guest.

NEEDLE MAKING.—At Borcette, which is the most important center of needle manufacture in Europe, the conversion of the rough needles requires forty operations, the principle of which are measurement of the wire, the scouring, and the cutting into lengths. The pointing is done with grindstones. By the aid of a copper finger, the workman holds fifty wires at a time, which are heated to redness by the friction. After the sharpening, boys cut the wire in two, flatten the head, anneal and punch the eyes. The tempering and annealing require nine operations, but they are done in piles of 15 kilogrammes (33.60 pounds), containing more than 300,000 needles. One million needles are polished at one time. There are five operations which are each repeated seven or eight times. The needles are put in hollow rollers with small hard stones and colza oil. The stones are gradually pulverized, and the friction of the powder gives the principal polish. For the final polish oil and coarse bran are used. The sorting of the polished needles requires five operations. After burnishing they are put into papers.

THE PREPARATION OF LOGWOOD.—The logs of dye-woods are fed endwise to a cutter, a number of knives on a revolving wheel. The cutter removes about an eighth of an inch at every stroke, but in the course of a day 3 tons are thus hewn into bits. Power equal to 30 horse is used in this part of the process. Thus far the dye-wood is of no more use as a dye than any other wood. For some uses the wood is only cut as given above, but for others it must be ground in a mill like that for grinding corn. After it has been reduced to the required fineness, the dye-wood is packed away to cure. In heaps it is treated with water. Fermentation begins, the wood begins to assume a rich garnet color, and the acid is extracted. If the heat becomes too great within the pile, the virtue of the wood departs. To avoid this it is shoveled over and over five or six times, and in three or four days the ground or chipped dye-wood is ready for the consumer. By the use of hot water the wood is cured ready for use in a day. Logwood, cam wood, Lima wood, fustic, California red wood, and some other woods are treated in this way. If the woods are brought to market green, there is a shrinkage of 40 to 50 pounds to the ton, or 2½ per cent. In the preparation of the wood the value increases about 50 per cent. Last year was a dull year for dye-wood grinders, but the business is active now, comparatively.

ITEMS OF INTEREST.

THE income from tobacco during the past fiscal year was $47,536,997.60.

ASHE county, North Carolina, produces 1,646,000 pounds of copper yearly.

AN almost inexhaustible supply of emery-stone is reported to have been discovered near Schimersville, Pa.

A STEAM-LAUNCH, built entirely of phosphor bronze, has been given a successful trial recently on the Thames.

THE price of brick has declined to $5.75 per thousand and builders claim that the price will be still lower this fall.

THE printer does not generally wear much jewelry, although he is constantly handling "diamond," "agate" and "pearl."—*Boston Com. Bulletin.*

A NUMBER of individuals in South Wales are said to be making preparations to come to the United States and engage in the manufacture of tin plates.

IN the matter of iron shutters for stores, the insurance companies and firemen maintain that, as usually constructed, they fence in the fire and shut out the firemen.

WOOD worms can be destroyed in books and woodwork by benzine, a saucer of which in a closed bookcase will kill off the insects as well as their larvæ and eggs.

THE Russian petroleum wells are operated by Americans, and as they have already commenced shipments to England they will find themselves competitors with American petroleum.

AT Tecumseh, Ala., the Tecumseh charcoal-furnace has gone out of blast for an overhauling, after the rarely, if ever, precedented run of seven years, one month and nineteen days' continuous blast.

AN electric railway is projected in Cincinnati to run from the top of one of the hills two miles or so into the suburbs. The Cincinnati hills themselves afford an excellent opportunity for electricity to show what it is capable of.

SPIRITS OF TURPENTINE is now made from sawdust and the refuse of the saw mill. It is extracted by a sweating process, and yields fourteen gallons of spirits, and a quantity of tar per cord. The spirits produced have a different odor than that produced by distillation.

AN ingenious patentee proposes to supply towns with the electric light free of cost. His "idea" is to attach the lamps to advertising columns, and the rent paid for displaying the notices is supposed to cover the cost and leave a surplus sufficient to pay a good interest on the outlay.

THE Secretary of War is reported to have ordered engineers to begin the survey for the proposed Hennepin Canal, with the object of pushing the work soon after Congress meets in December. The friends of the scheme hope to bring it up early in the session, and to get an appropriation to begin the work.

ARRANGEMENTS have been made for building a new line of railroad from Toledo, Ohio, to Allegan, Michigan, the object being to reach the lumber trade of Northern Michigan, and at the same time to supply the iron and copper works of that section with coal from the line of the Ohio Central Road, of which the Ohio and Michigan will be a continuation.

SOON the work of reclaiming the Zuyder Zee, Holland, will begin. A dike of twenty four and a half miles is to be made of sand, faced with clay, and so high that it will be six and a half feet above the greatest tide level. The time for the completion of this undertaking is estimated at from seven to ten years, and the cost about $40,000,000.

THE watch presented by the employes of the National Machinery Co., Cleveland, on Monday last, to its secretary, Mr. W. R. Anderson, was manufactured by E. Howard & Co., Boston, and supplied by Brunner Bros., 255 Superior St Cleveland. It has an 18 carat box case, in the St. Louis Quartorze style, undoubtedly the finest case made in this country or Europe.

THE *Hub*, which is the organ of the carriage and wagon trades of this country, says that there are 3,052 carriage and wagon shops in the United States, with a capital of $33,000,000, paying $17,000,000, annually to 47,000 employes, who turn out an annual product of $56,000,000. It concludes from these figures that the annual output of wagons and carriages in America is about 1,000,000.

THE experiment of the master mechanic of the Pittsburgh & Lake Erie Railroad in using coke instead of coal on an engine has been thus far a success, both economically and in doing away with coke and cinders.

MECHANICAL RECEIPTS AND ITEMS.

TO PACK STEAM ENGINES.—Make the packing tubular and perforated with holes to allow the condensed steam to flow out and aid lubrication.

TEMPERING AN AXE.—Take six pounds of beeswax, and one ounce of finely-pulverized sal-ammoniac. Melt the tallow and beeswax together, and then put in the sal-ammoniac. Pour the mixture into a sheet-iron box, which, for convenience, should be two feet long, four inches wide and four inches deep. A box of these dimensions will hold enough of the mixture for tempering any sized axe, hoe or other tool. When the axe is ready for tempering, heat to a white red; then put it into the mixture deep enough to cover the steel all over. Let it remain from one to two minutes, then put in the water the same way Then draw to a blue color and return to the mixture as before. Then hold it over the fire until it becomes dry, and then put it back in the water to cool. Never heat the steel more than to a light red when forged out.

CUTTING SCREWS OF INCREASING PITCH.—Prof. J. B. Webb, of Cornell University, read at the recent meeting in Montreal of American Association for the Advancement of Science a paper on a method of cutting screws of increasing pitch. "If we wish to cut an ordinary screw," he said in substance, "we can do it by milling out the groove instead of turning the screw in the lathe. To do this we mount the blank screw in journals and mount a fixed pin to work in the groove after the manner of a nut. To start the operation we must have a part of the thread commenced, enough to reach from the milling cutter to the nut. After this the screw, if revolved, will feed itself along by screwing past the nut or pin, and the milling tool will keep on cutting a screw of constant pitch. If now we arrange the apparatus so that this pin or nut has a feed dependent on the revolution of the screw, which causes the nut to increase its distance from the milling cutter, then, instead of a screw of constant pitch, there will result a screw whose pitch will increase with the arithmetical progression."

VELOCITY OF CUTTING TOOLS.—From the circumstance that man's past experience has been acquired in the treatment of wood and the softer metals which admit a higher velocity, the earlier attempts to bore and turn cast iron on a large scale failed, because the force was applied in a wrong condition. As experience was gained, it became apparent that a much slower velocity combined with great pressure was necessary, which entirely overcomes the difficulty. The range of velocity found most suitable for different substances lies rather wide. Cast iron requires a slower motion than wrought iron, and may be said to range between twelve to twenty feet per minute, according to hardness. Sandstones, from their structure, require a slower motion in the planing machine when being shaped into blocks or columns, and a slower motion still is found necessary by granite turners, where the action is detrusion and the edge of the detruding instrument or disc moves in unison with the granite column. Going in the other direction, the limit of speed has scarcely been reached. A velocity of 8,500 revolutions per minute is employed in the fine cutting of wood; and even then high speed is not found to heat the instrument to a degree which would necessitate discontinuance of the operation. It is different when the piece of wood itself is driven at that high speed, as in the case of wood turning, because from the friction exerted on one point only, the temper would be taken out of the cutting instrument. This remarkable difference arises from the swift revolution of the cutting instrument, where two new conditions are found to step in. The first is that due to the extent of the cutting points. When each acts in turn, they give a momentary rest to all the other points. Secondly, the instrument whirling at such a high velocity is in the position of a blowing fan, and is thereby kept cool by the presence of the atmosphere.

USEFUL RECEIPTS.

MEASURING BELTS.—An ordinary two-part clamp, with a hook on one plate, is secured to the belt, and to the hook is attached a common spring balance such as icemen use. The other end of this is in turn fastened to the nearest wall or timber that will give a direct pull. The engine is then started, and the reading of the spring balance at the moment the belt slips is the actual resistance or tension of the pulley. This, multiplied by the speed of the belt per minute, gives the total foot-pounds transmitted by it for the time reckoned.

TO DETECT LEAD IN TIN.—A drop of concentrated acetic acid is let fall upon the suspected leaf, and a drop of a solution of potassium iodide is added. If there is lead present there is in two or three minutes a yellowish spot of lead iodide. Kopp moistens the leaf to be examined with sulphuric acid. If the tin is pure the spot remains white, but if lead is present there is formed a black spot.

SILVERING AND GILDING ZINC.—A process has of late been published in Germany to copper plate zinc articles by simply suspending them on zinc wires in a so-called solution of blue vitriol and caustic potash, which, to prevent a precipitate being thrown down, is mixed with tartaric acid or glycerine. Articles made of sheet zinc are better adapted for plating with brass than cast zinc, because the latter, if not most carefully handled, are liable to be disfigured with black spots.

WATERPROOF GLUE.—Take of shellac, three parts; india rubber one part, by weight. Dissolve each separately in ether free from alcohol It is best to do this in stoppered bottles and without heating, as the ether readily evaporates. When solution is complete, mix the two, and keep well stoppered for use. This glue resists the action of water, both hot and cold, and most of the acids and alkalies. Pieces of wood joined together by it, will break at any other part than at the joint thus made. If the glue be thinned by the admixture of ether, and applied as a varnish to leather along the seams where it is sewed together, it renders joints water-tight.

TO BEAD BOARDS.—A center-bead may be fitted to the arms of a plow, and adjusted for center-beading narrow stuff, such as ceiling or flooring. For beading wide boards, a pair of long arms might be fastened to a block for a face-guide, and by means of keys or thumb-screws, secured in any position. Among some workmen it is customary to tack on strips against which to run the plane, but, aside from the extra time lost by this way, it may often be impracticable, especially if working on hard wood finish, where nail holes are sought to be avoided.

OLD GOLD COLOR.—A fashionable color in Paris this year, especially for feathers, is known as *Vieil Or*. M. Julliard, in an article in the *Union Pharmaceutique*, states that this color is obtained from a preparation known in the trade as mandarine, which is a preparation of turmeric, orseille, indigo carmine, and the aniline dye Orange II. The indigo carmine is used only in very small proportions to give the tarnished appearance, and the Orange II. is also used in quite small quantity to make the color more permanent. Feathers to be dyed this color are generally first treated with a solution of salt of sorrel, oxalic acid, or sulphuric acid.

TO PRESERVE ELASTICITY OF INDIA RUBBER.—The hardening of vulcanized india rubber which takes place with piping and other goods after a short period of use, is said to be caused by the gradual evaporation of the solvent liquids contained in the india rubber, and introduced during the process of vulcanization. Experiments made for a number of years to find a method of preserving the india rubber seem to indicate that keeping the articles in an atmosphere satutated with the vapors of the solvent will answer the purpose. India rubber stoppers, tubing, etc., which still posess their elasticity, are to be put in vessels containing a dish filled with common petroleum. Old hard india rubber may be softened by letting the vapor of carbon bisulphate act upon it. As soon as it has become soft it must be removed from the carbon-bisulphate atmosphere and kept in the above way. Hard stoppers, it is said, are easily made fit for use again in this manner, but the elastic properties of tubing cannot well be restored.

FOREIGN CORRESPONDENCE.

ENGLAND.

WOLVERHAMPTON, September 16.

High class metal maintains a firm value, and is less irregular than a few months since. The resolution of the Scotch ironmasters not to renew the agreement with Cleveland makers in regard to a restriction in the manufacture of pigs to the extent of 12½ per cent. of the furnaces in blast, points, perhaps, to a speedy re-lighting of more furnaces in the north, and consequent extra replenishing of the pig iron market. The decision thus come to is held to point to the belief of the Scotch ironmasters that the market in pig iron generally is equal to that much addition to the output involved in the resolution referred to. Since the announcement of this decision the market has been depressed to the extent of 10d. per ton, bringing the present value to 49s. 7d. It is not generally thought that we shall see any further serious fall. During the past twelve months stocks have decreased about 14 per cent., and the prospects of the trade are considered hopeful. As regards finished iron, the market remains, on the whole, very steady, second class bars being, however, slightly easier to the extent of 2s. 6d. per ton. Sheets are firm at 10s. to 15s. advance upon the prices current in May last. For various markets in America larger quantities of iron are wanted, but makers will not enter into extended bargains owing to difficulties having arisen in the past with the same customers, who had desired to repudiate contracts when the value afterwards turned against them. The demand for exportation is not quite so large at the moment, but a very fair business is being done. The rolling mills keep in full work, but most of the rails made are going into stock, as the inquiry at the moment for this class of material is not so good Bars are stiffer. I quote £6 5s., angles, £6 to £6 2s. 6d.; ship plates, £6 15s. to £7; boiler plates, £7 15s. to £8; sheets, £8; iron rails, £5 5s. to £5 10s.; less 2½ per cent; puddled bars, £4 to £4 2s. 6d. net.; steel rails, £5 5s. Freights are still easy obtainable at 10s. per ton, and the shipments are consequently heavy and regular.

MASSIVE STEAM ORE STAMPS.

Cuyahoga Steam Furnace Company, Cleveland, O.

Our attention has been called to some massive steam stamps built by the Cuyahoga Steam Furnace Co. for use in the copper stamp mills of Lake Superior. These machines possess features of construction which render them of interest to machinists. Work of such massive character has heretofore only been attempted by the largest establishments in Philadelphia, New York and Boston, and while the increased magnitude of mining operations as now carried on in the copper mines of Lake Superior have demanded much heavier machinery of all kinds, it had only recently become known that it could be supplied in our own city, thereby saving the large expense attending the handling and shipment of such heavy masses from the East to the shores of our western lake. It is safe to presume that in the future a large share of orders for such work will be placed with Cleveland shops. For holding the stamp in place a deep pit has been dug, of which the foundation is concrete, braced with sawn timber 14 inches square, piled closely together, 16 feet long, 16 feet wide, and nearly 16 feet deep. Within this mass of timber will be placed 53 foundation bolts of best quality, 2 inches in diameter. Upon the top of these timbers and bolted to them are two iron sills weighing many tons; above these are two additional cross sills of iron, upon which rise four iron columns twenty-one feet high, upon the top of which is placed the inverted steam cylinder used to lift the stamp shaft within the column, and resting upon oak timber is the anvil block, which weighs over 12 tons. Immediately on top of the anvil block rests a huge casting called the mortar. The bottom and sides of the mortar are lined with plates of white or chilled iron. These plates are made separately so that they may be replaced when worn out by the action of the rock containing the copper ores. Four sides of the mortar are screens or perforated plates. Within the frame or columns and moving through guides is a stamp shaft, so called. This is a shaft or bar of iron made from the best selected scrap iron welded under powerful helve hammers so as to withstand the constant jar or shock incident to falling 90 times per minute on the hard conglomerate rock in which native copper is embodied. The upper end of the stamp shaft is attached to the piston rod of a steam cylinder which is actuated by a very peculiar valve gear, lifting and dropping the stamp shaft with a motion not unlike that of the pestle of the druggist's mortar. The lower end of the stamp shaft is shod with a white iron shoe, which may be replaced as fast as worn out. The action of the stamp is as follows: The rock containing shot copper after passing through a Blake crusher to reduce it to uniform size is shoveled through an iron spout into the mortar while the stamp shaft is in motion; at the same time a large stream of water is turned into the mortar, the descending stamp shaft crushes the rock and at the same time splashing it up against the inside of the perforated screens, and at each blow a portion of the crushed rock, together with the liberated copper and a portion of the water, passes through the apertures in the screens, and together with the mixture is carried away to be separated by jiggs, slime tables, etc. Occasionally the stamp is stopped, and the mortar cleaned out of those larger pieces of copper which, on account of their size, cannot pass through the screens. The use of the direct acting steam stamps is by no means a modern device for extracting copper ore, as similar stamps have been in use for many years. These stamps, however, were built very light, and the framing was of wood instead of iron, consequently they were a source of much trouble on account of their warping, twisting, and getting out of line, as well as their tending to split and rot. It may be expected that the introduction of the four massive Cuyahoga four grate stamp, now being got up for Lake Superior will produce a marked effort upon the dividends of the companies possessing them by increasing the annual output of copper. We understand several other copper mining companies have in view the purchase of these stamp if they prove as successful as anticipated.

SCIENCE AND INVENTION.

GLASS COATING ON METALS.—The following method has been suggested for coating metal surfaces with glass, which may be found to answer various purposes: Take about 125 parts (by weight) of ordinary flint glass fragments, twenty parts of carbonate of soda and twelve parts of boracic acid and melt. Pour the fused mass out on some cold surface, as of stone or metal, and pulverize when cooled off. Make a mixture of this powder with silicate of soda (water glass) of 50 deg. B. With this coat the metal to be glazed, and heat in a muffle or other furnace until it has fused. This coating is said to adhere very firmly to steel or iron.

TEMPERING BESSEMER STEEL WIRE.—The invention of Mr. Carter, of Manchester, England, for this purpose consists of a single or double furnace through which pass longitudinally a series of troughs or tubes (placed preferably side by side), their ends outside the furnace walls being slightly elevated so that the tubes can be filled with spelter, dross, or lead, which is kept in a state of fusion by the heat of the furnace. The wires from the reels or hanks pass through these tubes (in at one end and out at the other) and in passing through the molten metal become raised to a red heat. They then pass at once to the second part of the apparatus, consisting of a shallow vessel containing spirits of salts, into which they are caused to dip by passing under a roller immersed therein. This vessel is supported on brickwork and is covered over so that the condensed vapors may be collected and conveyed away (preferably through the furnace flues). This cleans the wire, which then passes through a similar vessel (not closed) containing a solution of lime and sulphate of copper to give the same an anti-corrosive coating, and finally passes through tubes or flues in another furnace for baking the same, and then passes to the reels or blocks on to which it is coiled for use.

A NOVEL LOCK.—A novel feature in locks constructed according to an English invention is that the "sliders" of the lock (which are acted on by the key or handle) project through the case of the lock and themselves form the bolt or latch which secures the same, so that the sliders are the only moving parts. The sliders are formed with two openings of a rectangular or other suitable form, in one of which works the key (which is double-bitted), and in the other the stud of the handle, which has two bits or vanes. When either the key or the stud of the handle is turned it moves some of the sliders in one direction, and the rest in the other.

LUBRICANT FOR CARRIAGE AXLES AND BEARINGS.—Thomas George Alcock, of Manchester, and James Johnson, of Stratford, England, have patented in that country the following composition of materials for a lubricant for carriage axles and bearings: They place four parts tallow, two parts water and two parts soda in a vessel, to which they then apply heat, and they agitate or stir the contents of such vessel until thoroughly melted and brought to the boiling point; they then pour the liquid into another vessel and keep the same agitated therein until quite cool.

PUMP FOR COMPRESSING GASES.—M. Cailletet has invented a new pump for compressing gases to a high degree of compression. The main point in its construction is the method by which he obviates the existence of useless space between the end of the piston-plunger and the valve, which closes the end of the cylinder. This he accomplishes by inverting the cylinder and covering the end of the plunger with a considerable quantity of mercury. This liquid piston can, of course, adapt itself to all the inequalities of form of the interior space, and sweeps up every portion of the gas, and presses it up a conical passage into the valve. The valve, by which the air enters the body of the pump, is opened by a cam-gearing after the descent of the piston below the point where the air rushes in.

NEW RAILWAY SPIKE MACHINE.—A new railway spike machine has been successfully tried at the Superior Iron and Steel Works, Allegheny, which will be likely to work a decided advance in that industry. All the motions are direct and positive. The rods from which the spikes are made are fed directly from the rolls without re-heating, thus ensuring uniformity in thickness. The rods are introduced into the spike machine by an automatic table, with a gripper which catches the rod and feeds it into the length of one spike. At the end of the stroke of the feed table, the spike blank is caught and firmly held by a vertical ram, while a pair of reciprocating cutters cut the blank to the required length and at the same time form the point by a motion which combines the qualities of drawing and cutting, thus bringing the point of the spike to a fine edge. The blank is then released and seized by a strong horizontal ram and carried forward to the header. While it is going forward, the end of the blank is bent over to the right by a quickly acting lever, so that the head is properly formed. At the end of the forward motion the blank is forced against the heading die and the spike is finished. On the return motion the spike is released from the ram and thrown out of the blank holder by a rapidly acting "knocker," when it falls to the floor and the table goes back to the cutters to receive the next spike. All these motions comprise a revolution of the machine and follow each other so instantaneously that they altogether occupy but a single second.

CUTTING GLASS.—Mr. Fahdt, of Dresden, uses metal wires, which have been made red hot by electricity, for cutting glass. The apparatus consists of two screws, which are fastened on a plate at a distance from each other varying with the size of the object which has to be cut. The screws are in communication with the poles of a battery, and carry at their tops a metallic wire, which is placed round the object which has to be cut. The glass is carried by supports. When the circuit is closed the wire becomes red hot, and the places where the wire touches the glass (the glass can be turned round by hand) become heated, so that by sudden cooling, or the contact with a humid body, a severance of the glass takes place. In order to remove the inequalities on the sections which have been thus obtained, the glass pieces are placed on an apparatus, in which the section is exposed to the flame of a chalumean, the glass piece being made to revolve, in order that all the parts are touched by the flame. The glass is then taken to a heating furnace in order to prevent the heated parts becoming broken by too quick cooling. The glass is then removed to a room where it is left to cool.

THE value of the export of breadstuffs in August last amounted to $28,834,987, and in the eight months ending August 31 to $110,015,703 as against $157,505,205 in the corresponding period of 1881.

INDUSTRIAL SCIENCE.

Designing Machinery.

When once it has been decided that a machine or piece of mechanism is needed, the first step toward accomplishing the result is to produce a rough sketch of it, which, if consisting of more than a very simple contrivance, is followed by a proper drawing made by a skilled draughtsman, who will overcome the preliminary difficulties, such as those dependent on position, or taking care that one piece of mechanism does not foul another either when at rest or in some part of its motion, or that speed of parts is consistent with natural laws, and that the strength of the various members are properly proportioned, and so on. This may very likely be sufficient to determine the practicability of the machine, but very frequently it is necessary to actually experiment, so as to determine the behavior of natural forces one upon another. For instance, no amount of drawing or calculation could tell Mr. Bessemer whether his invention of blowing air through pig iron would convert it into malleable iron. The drawing of the converter, and of the blowing machinery, might have been perfect, but the final result could not have been told without the experiments. So, also, in the Siemens regenerative gas-furnace, the drawing might be made of the furnace, but only trial could secure that firebricks were numerous enough in the unregenerative part. Too frequently the careful working out of a drawing is thought to be a superfluity, forgetting the old maxim that it is better to spoil paper than wood or iron. It can never be too much impressed upon the would be inventor that careful drawing and calculation is not money thrown away, but money frequently saved. The inventor is too frequently dazzled with his one idea for the time being, and thinks that it must, as a matter of course, be all right and perfect, and sure of success straight off. Machines for perpetual motion are frequently evolved by persons of this kind. It is thought that a man can invent successfully without any training and without knowing the scientific principles of the thing he is dealing with, or the history of what has been done before in the same direction. The inventor too frequently has not only his mechanical idea, but the further idea, for the time being, to wit, that he is a brilliant genius, and entertains an exaggerated estimate of the difficulty of mechanical invention. It is important, therefore, to point out to those who are too frequently led away with a will-o'-the-wisp, that the power or faculty of inventing mechanical contrivances is one of the most common of talents with which humanity is blessed. It is only the beautiful and clever combination that is rare, which has generally been evolved by natural genius, careful training and unremitting perseverance. The success of most great inventions is due more to patient thought, unremitting hard work, and close study over a term of years, than to any flight of genius.

Wrought Iron.

Dr. Anderson, in his lecture on "Tools," lately delivered in Manchester, England, said: When we think of any sort of material, beyond the working treatment of their mechanical properties, we seem to be in another world. Take, for example, a piece of common wrought iron. It seems to us as of the earth earthy; but, if we are closely questioned in regard to the reason for its various properties, we find that we scarcely know anything. Tracing it from the ore through its various stages until it is in the hands of the smith, is comparatively easy. We know the natural law that governs its elasticity, the limit of its elasticity, its ultimate strength; that it can be welded; that it is ductile, and can be drawn out into a fine wire; that it is malleable, and can be spread out into a sheet, or worked round from the sheet into a goblet, and may be gathered back again, if by so doing it served any useful purpose; but when we think of the marvelous changes which have taken place amongst its molecules during the operation, we are lost in wonderland. To many minds, the piece of cold iron seems to be a solid; under the pressure of the testing machine, it is shown to be an unstable fluid. When the smith has the misfortune to leave a piece too long in the fire, it vanishes; it has found evil companions, and gone off under an assumed name and a new character. When a piece of iron is broken and carefully examined under a microscope, we can see that it is composed of fine crystals; but these crystals, we are told, are composed of innumerable molecules, which are not to be seen by the microscope, being smaller than the human mind can imagine; still, the smith feels himself under their influence. In homely words, he speaks of the iron being "red-short" or "cold-short," without thinking that he is on the threshold of some of the impenetrable secrets of nature. The steel-maker can take advantage of the molecular properties. With heat he can push them asunder and infuse amongst them the subtle vapor of carbon, and the iron becomes steel, highly improved in most of its mechanical properties, and with an increase of strength and elasticity. It may be inferred that each iron molecule is a little world in itself, surrounded with a thin wrapping of infinite space, no single molecule being in actual contact with any other molecule. We have reached the limit of sub-division, so far as the engineer dare venture. The investigating philosopher, however, ventures much further with his speculations; he tries vainly to penetrate into the supposed ultimate atoms of matter of which the molecules are composed, but further we need not follow. Suffice to say, that a piece of common wrought iron is altogether a mystery, and teaches man the lesson of humility.

New Process of Steel Casting.

A new process, invented by Mr. George Cowing, of Cleveland, and now owned by the Cowing Steel Casting Co.. of this city, is attracting a good deal of attention in a quiet way among steel manufacturers and others interested in the production of sound, soft and accurate steel castings. Briefly described, the process is one of making the mold of pure silica, held together by a slight admixture of flour and glue-water, merely enough being used to give adhesion to the material. An incidental advantage of the new method of making molds over that employed in England, is the fact that the mold, after being poured, loses its adhesion about as completely as a green-sand mold, and, of course, offers no resistance to the shrinkage of the metal, while the Lowood mold is very hard, and is liable to induce fractures while the metal is in process of cooling. In making the new molds a finely-ground quartz is used, mixed with glue and flour, as we have said. Such a mold would be too porous if no facing was used, the melted steel being very fluid and penetrating even the spaces between the particles of sand forming the mold. This consists of silica or quartz ground to an impalpable powder, and applied in the usual way. When this is thoroughly slicked down the surface is dense enough to resist the passage of metal, but will allow the free escape of gas. With these molds it is said that any grade of steel can be cast with perfect ease, and not only without alteration in its chemical composition, but with perfect freedom from blowholes or imperfections of any kind. Mr. Cowing has made castings containing only 7-100 per cent. of carbon, that is, .0007, so low a percentage of carbon as to bring them more properly into the grade of wrought iron than steel. Castings of this grade, when taken from the mold, will bend nearly double without any annealing. These castings are beautifully smooth and perfect without any cleaning, and gave every indication, not only of perfection as a casting, but as a metal also. All parts of the mold were accurately filled, and every portion gave every sign of soundness. No difficulty is found in pouring, and the sprue taken under the hammer, drew down from 2 inches and a fraction square with the size of nail rod with perfect ease, showing no sign of flaw and working with great toughness. The steel used is open-hearth.

Electricity For Tramcars.

Electrical science has advanced to such a point of progress that in the near future there is promised some striking practical attempt at illustrating the application of electricity as a motive power. An interesting experiment has just been tried in England, at the carriage works of the North Metropolitan Tramways Company, Leytonstone, when a specially constructed tramcar was propelled along the metals on the public road outside the works by the use solely of electricity. The conveyance used was one built in Belgium, and might be taken to be a rough model, built upon the lines of the ordinary tramcar. The easy means of storing electric power by Faure's accumulators, gives a ready opportunity for putting to the test the question of propelling a machine by electricity. A number of these electrically-charged accumulators, weighing a ton and a half, were put on each side of the tramcar experimented upon. Wires, regulated by a switch, were placed in connection with the stored force, and a dynamo machine underneath the car. By turning the handle of the switch a current of varying degrees of intensity could be passed through the dynamo machine, while the passage of the current could be altogether stopped in an instant. Now, the effect of the current upon the dynamo machine is to cause it to rotate proportionately to the intensity of the current, and attached to the dynamo machine was a tooth-wheel in rigid connection with other tooth-wheels fixed to the axles. The result of the rotation of the dynamo machine was, of course, the propulsion of the tramcar along the lines of metal. From the tramway carriage works in Union Road, Leytonstone, the car was run a distance of about half a mile, and then run back to the works again several times, the highest rate of speed attained being about eight miles an hour. The speed could be slackened, or the progress altogether stopped most readily, by the simple turning of the handle regulating the switch; and, again, the reversibility of the dynamo machine allows the tramcar to be propelled either way. The strange sight of a tramcar running along the road without any visible means of propulsion, save the switch giving forth electric sparks upon the handle being turned, was an object of general curiosity to the people. A drawback to the use of steam for tramcars is the smoke nuisance, but with electricity there is no such disadvantage; indeed, all the appliances, the stored force, and the machinery beneath the car, are out of ken, although not out of hearing. In fact, during the experiment, the working of the gear beneath the car occasioned a cranking noise, which would be decidedly objectionable in ordinary tramway traveling. This noise, however, it was explained, arose from the gear being fitted together hastily and roughly, merely for experimetal purposes; and it was stated that, with proper precaution, the great amount of friction might be avoided. For a large tramway company it is represented that the employment of electricity instead of horse power would effect a saving of 50 per cent. While the cost attending the use of horses upon an extensive tramway service would be £100,000 a year, the value of the rolling stock would be only £40,000, and therefore the rebuilding of all the tramcars on such a line to suit the application of electricity for drawing purposes would not be a matter of much account, supposing it were thought that the time had come for entering upon such a course. There would have to be of course, stations for the charging of accumulators with the electric force, and the exhausted accumulators would be taken from the cars at different periods of the day, probably two or three or four times, and fresh ones, duly charged, put on board.

ELECTRIC LIGHTING.—Electric lighting is older than gas lighting, and its strides have been much less rapid and positive. Sir Humphrey Davy exhibited the electric light in London while the city was dimly lighted by oil-lamps, and before gas-lighting had been attempted anywhere. The lamp used by Davy at the beginning of this century was capable of giving a dazzling arc four inches in length, being vastly more brilliant than modern arc-lights. Even the incandescent lamp is nothing new, but was originally invented by a young American named Starr, who died in 1847. This inventor, in whose experiments Mr. Williams shared, tried wicks of platinum and irridium alloys, and abandoned them as Edison did thirty years later.

THE Edison Co. have now completed the establishment of a factory for the manufacture of their dynamos, lamps, etc., in Paris. Owing to the laws of the country it was absolutely necessary to establish a factory where everything appertaining to the system could be manufactured, as if any foreign article is imported into France and sold, the patents obtained for it become void in that country.

FINDING UNDERGROUND WATER COURSES.—A new use of the micro telephone is that of finding underground water courses. The microphones are buried in the soil on a hillside, and each connected with a separate battery and telephone. By listening at the telephone at night, the faintest murmur or gurgling of water can be detected.

THE John Hauck Brewing Co., of Cincinnati has been incorporated with a capital of $1,000,000

LAKE SUPERIOR IRON ORE.—At the late meeting of the tariff commission in this city, George H. Ely, of Cleveland, read a statement on the Lake Superior iron ore interest. Representatives of that and other iron ore districts had not had any conferences as to the rate of duty which they would recommend, but all stand on the common ground of the necessity for some duties on iron ore. The total contribution of Lake Superior ore to to the iron trade of the country from 1852 to 1881 was over 17,000,000 tons. The capital employed in mining iron ore in the Marquette and Menominee Districts is $50,000,000, and that employed in transporting ore to market is about $24,000,000, making a total investment of over $75,000,000. Both of those mining districts support 50,000 people. He denied that that there is an insufficient supply of domestic ores of qualities requisite for making Bessemer steel. The supply of such ores is abundant, and they are distributed in different parts of the country. Reliance on foreign importation of iron ore is out of the question. Home production ought to receive every possible encouragement. Monopoly in an article of such inexhaustible supply over the entire continent is impossible. The capital and labor employed in the business should be allowed without detriment from foreign sources to work out the necessary and never failing result of competition—the cheapening of product. In that direction only is safety and cheap iron.

RUSSIAN AND DUTCH STOVES.—The ordinary Russian stove, or that most ordinarily used in Russia, is square in contour and is divided into horizontal partitions. The fire is, as is the case in the majority of stoves, kindled from below and the hot air and smoke pass in a zigzag course above and between the partitions. Owing to the fact that the dividing interior walls of the stove are formed of glazed tiles and that the whole of the stove is, as far as permissible, of brick or tiles, the heat is to a great extent absorbed by these materials and radiates into the surrounding atmosphere but slowly. Great economy is exhibited in the use of fuel. The heating apparatus is arranged in such a manner that no smoke is admitted into the apartment, a stifling lack of ventilation, however, being observable frequently in rooms thus heated. The Dutch stove looks like an upright cylinder, is made of sheet iron, has one door near the top, and another near the bottom of the cylinder, a closed bottom and a top that can be closed or opened at pleasure, three legs of iron, and a flue hole at the side opposite to the doors. A grating of iron bars is placed between the levels of the two doors, for the reception of the fuel. The upper door, as will be apparent, is opened to receive fuel, and the lower to admit of draft and the removal of ashes. A cover is provided for the admission of cooking utensils. This stove, as well as the Russian, is said to effect a saving in the consumption of fuel.

ORIGIN OF MALLEABLE IRON.—To Henry Cort is usually attributed the discovery of the process for converting cast iron into malleable iron. But careful investigations have led us to the conclusion that the honor is due to Dr. John Roebuck, the grandfather of the late distinguished member for Sheffield. Dr. Roebuck being a good practical chemist, his inquiries led him when residing at Birmingham, where he practised as a physician, to seek for more economical methods of smelting ore than those then in use. Being joined in the enterprise by some Birmingham and Glasgow gentlemen, he selected a site on the banks of the Carron, a small stream near Falkirk, and there he planted the germ of the now celebrated Carron Works. Dr. Roebuck's specifications leave no room for doubt that he was the inventor in 1762 of the process for converting cast iron into malleable iron. The specification distinctly states that the cast iron was melted on a hearth with a blast aud then worked "until reduced to nature," in that state it was exposed to "the action of a hollow pit-coal fire heated by the blast of the bellows until reduced to a loop," which was then "drawn out under a forge hammer into bar iron."

PRODUCTION OF LUMBER.—To produce 1,000,000 feet of lumber and place it upon the market requires the services of 10 men for one year, and to manufacture the lumber supply of the three great lumber States of Michigan, Wisconsin and Minnesota, 80,000 men are steadily employed and they are the direct support of thousands more. In the manufacture, shipping and distribution of 50,000,000 feet of lumber annually, one company employs 500 men, and full $2 per thousand is expended by it for supplies and merchandise consumed by these men. Not less than $15,000,000 is disbursed annually by the lumber manufacturers in Michigan, Wisconsin and Minnesota alone, for the supplies and merchandise consumed by their men. Besides this the entire sum paid the vast numbers of men for wages is expended in the markets of the United States, and with the exception of the cost of stumpage and the manufacturing profit, the remainder of the price of lumber is paid for labor, provisions, merchandise, hay and grain.—*Northwestern Lumberman.*

FURNACE FOR ANNEALING IRON WIRE.—A gas heated furnace has been constructed by Mr. Putch at the works of Messrs. Kern & Co., in Gleiwitz (Silesia). The apparatus, which is used for heating iron wire, consists of ten ovens, receiving their gas from seven generators, which are fed with small coal. The ten ovens are in a circle, in the center of which is a crane for moving the pots and weights. The ovens have a cylindrical form, and the gas penetrates under them in the burners, in which it becomes mixed with atmospheric air. The flames surround the wire pot, and the products of the combustion leave through a hole in the top of the oven and pass into the chimney. In this apparatus twenty pots, containing on an average 1¼ tons of iron wire, were heated in 12 hours, the production thus reaching 25 tons in 12 hours. The apparatus has been at work for over one year, and it is stated that the pots last much longer when heated in this apparatus.

WATER-SOFTENING PROCESS. — The important question of the softening and purifying of hard water in bulk has received a satisfactory solution in the Atkins process. In practice a small jet of lime water is introduced into a portion of the water to be softened, and the two are blended in a mixer, whence they flow into a softening tank, into which the bulk of the water is conducted. From this tank the water with the lime in suspension flows into the Atkins rotary disk filters, in which the solid particles are all arrested by an ingenious system of cloth-covered disks placed within a very small compass. The purified and softened water is conducted from the filters to the storage reservoirs ready for use. The effect of the lime water is not only to purify and soften the water in bulk, but to cause any clayey matters that may be held in suspension to coagulate, thus facilitating their removal.

THE regular car manufacturers appear to be well supplied with orders, and a great many new cars are also under way in the road shops. These latter are mostly freight cars. The prospect of a dullness in this industry, which was apparent a few months ago, has ceased to excite uneasiness, in view of the big cereal crop that is maturing, and the possibilities of a car famine when the pressure comes for moving it. Passenger traffic also is likely to be well sustained.

MARKETS.

Office of TRADE REVIEW AND WESTERN MACHINIST.

FRIDAY EVENING, September 29.

FINANCIAL.

There has been an increased borrowing demand. A stronger tone prevails for discounts which rule at 7@8 per cent. Money is obtained at 5 per cent. on call and 6 per cent on time. There is not much currency going to the country. Eastern exchange is in active mercantile demand and the market is strong at 1-20 per cent. discount buying and par selling. Sterling exchange has been only in moderate demand. There has been an increasing demand for local securities and the market rules stronger.

IRON.

The cessation of the great iron strike has had its effect in giving new life to the iron trade, and the feeling is that industrial operations in this line enter on a new period of prosperity. We quote standard brands of No. 1 X Foundry at $26; No. 2 X at $23.50@24.50, according to brand and delivery. Scotch pig is somewhat firmer. We quote: Coltness, $26.50 to 27; Glengarnock, $24 to 24.50; Gartsherrie, $25.50 to 26; Summerlee $25.50 to 26; Carnbroe, $24; Eglinton, $23 to 23.50 from dock, and $23.75 to 24 from yard; Langloan, $25.50 to 26. No. 3 Middlesborough is quoted $22 to 22.50, and Bessemer, $23.50 to 24.50, with but moderate transactions. The demand for American steel rails is good, and sales have been effected at lower prices. Steel rails are quiet, and the mills are crowded with orders for early deliveries. We quote 3 cents for angles, 4 cents for Tees and beams; 4 2-10 cents for channels; 3¼ to 3½ cents for late and early deliveries of tank; 4 cents for shell; 5 cents for flange; 7 cents for fire base. The manufacturers report active inquiry for October deliveries. Prices are strong, but it is not probable that higher rates can be or will be asked. Merchant bar is active in small lots for immediate delivery at 2 6. For steel rails the market is quiet, but an immediate increased demand is looked for; we continue to quote at $48@50 per ton delivered free on cars. Railway spikes remain unchanged at 3 cents 30 days. Of splice bars and track bolts there is but a moderate amount in stock with but slight delivery. Wrought scrap, of which there is but a moderate supply, is still quoted at $24 per ton. For tank and wrought iron the active demand bids fair to be promptly supplied, and orders on Europe for same are being curtailed.

CINCINNATI.—Reported by Rogers Brown & Co.—A good deal of business has been done in a quiet way since last report, furnaces making slight concessions in some instances to secure desirable forward contracts. The effect of the close of the strike was, like the beginning, largely discounted in advance, so that the market is not perceptibly affected either as to prices or demand. Differences with the river mills below Pittsburgh are not yet settled and some time may elapse before resumption of work. The mill owners in the Wheeling district think the present an excellent time to equalize their scale with the Pittsburgh scale. The men refuse this and the lockout continues. The prospect of business in the car wheel trade is improving. Foundries continue to do a good business and mills throughout this district are running to their fullest capacity. We make no change in quotations for cash: Hot Blast Foundry—Hanging Rock, C. C., No. 1, $26.50@$27.00; Hanging Rock, C.C., No. 2, $25@$26.00; Southern No. 1, $24.50@$26.00; Strong Coke No. 1, $23.50@$24;50; Strong Coke No. 2, $22.50@$23.50; Strong Coke No. 3, $21.50@$22.50; Soft Stone Coal No. 1, $22.50@23.00; Soft Stone Coal No. 2, $21.50@$22.00; Forge—Strong Neutral No. 1 Mill, $21.50@$22.00; Cold Short No. 1 Mill, $20.50@$21.00. Car Wheel and Malleable—Hanging Rock C. B., $32@$34; Hanging Rock W. B., $26@$29; Southern Car Wheel Iron, $32@$36; Lake Superior Car Wheel Iron, $30@$33; Lake Superior Malleable, $30@33.

CINCINNATI—Reported by E. L. Harper & Co.—The business of the week has been fairly active and while the scarcity of number one foundry and mill iron would warrant an improvement in prices, the furnacemen are making a margin of profit on the prices current, and are content with figures ruling. Buyers naturally feel no apprehensions as to their ability to supply their wants in the future at figures prevailing, and anticipate their wants more for convenience than to secure any advantage in price. An improvement in car wheel irons is manifest, though the strictly cold blasts occupy a rear seat, and are a "little backward in coming forward."

COPPER.

Transactions in Lake Ingot have taken place at 18 cents, but sellers are asking 18¼ cents. Baltimore nominally quoted 17⅞ to 17¾ cents. London has ruled a little high, Chili bars being quoted £68.10 and Best Selected £73.

LEAD.

Considerable sales have taken place at $5.10 for common pig. Spot supplies are scarce and held relatively higher. Refined is nominally quoted 5.15 cents.

TIN AND TIN PLATES.

The market for tin shows fluctuations, and business has been moderate. Holders ask 25¼@25½ cents for Straits and Malacca. London cables, £106 15s; Singapore, $33 30, and Penang, $32.75. For tin plates the market is firm.

SPELTER AND ZINC.

The demand for spelter during the week has been moderately active. Sales have been effected at $5.40@5.50 for Common Domestic, and 5¼ for foreign. We quote Bertha Refined. 8c, and Bergen Port, 9¼c; Sheet Zinc, 7⅛c@7¼c.

HARDWARE.

Business in the hardware line is good. The demand for nails has been brisk, and some large lots have been sold on the basis of $4.00. With the numerous manufactories that are putting in additional nail machines and other manufactories starting up, lower prices may be shortly looked for. Dealers generally hold a better supply of nails, but stocks are still defective in assortment, some desirable descriptions being scarce. The manufacturers of augurs, chisels, and drawing knives have reaffirmed existing prices and terms. The Reading Hardware Co., Reading, have issued revised discount rates. The Lock Manufacturers' Association at its meeting decided on continuing unchanged prices and terms for door-locks, knobs, &c. The Stamped Ware Manufacturers' Association have placed the price of "Manual" goods at discount 60 per cent. to the retail trade. Parties whose purchases, exclusively from members of the association, amount to $1,000 and over are entitled to a further discount. M. F. Haberman was expelled from the association. A meeting of the manufacturers of Tinned and Enameled Cast Iron Hollow Ware, at Philadelphia, reaffirmed existing prices.

COAL.

Prices of coal have strengthened and a stronger disposition is manifested to purchase prospective supplies. Receipts have been large, but these have been met by considerable shipments.

LUMBER.

Values generally have stiffened. Transactions have been extensive. The demand for bill stuff, car sills and strips tends to improvement. There is more movement in yellow pine. The yards are well filled. There is a full supply of shingles. Considerable sales have taken place in hardwoods for furniture purposes.

LUMBER.

PLANK, MIXED WIDTHS.
2 inch, 12, 14 and 16 feet, together.

A 1 and 2 uppers	$50
A 3	40
B	32
C	20
D	14
E	12

1¼ and 1½ inch.

A 1 and 2 uppers	$48
A 3	40
B select	32
C	20
D	14
E	12

BOARDS.
One Inch, mixed widths.

A 1 and 2 uppers	$44
A 3	36
B select	30
C	19
D	15
E	13

STOCK BOARDS.
12 Inches wide.

A 1 and 2 uppers	$45
A 3	38
B	32
C	21
D	16
E	13

STRIPS.
6 Inches wide.

A 1, 2, and 3	$42
B	32
C	22
D	16
E	12
Norway Fencing Strips	17
Norway Flooring Strips	25

WORKED LUMBER
FLOORING.

Flooring—A 3	$42
B	35
C	24
D	20
Norway Flooring—A 3	28
C	22
D	18
Matched Drop Siding, 6 inches—A 3	42
B	38
C	24
D	20
Beaded Ceiling $2 higher than Flooring.	
One half inch Bevel Siding—A 1 and 2	24
A 3	20
B	18
Ash Flooring—A 1 and 2	40

BILL STUFF.

Small, joists, 12, 14 and 16 feet	$14
Timber, larger than 8x8 special.	
Timber, longer than 18 feet, adds about $1 per foot per M. extra.	
Cedar Posts, large	30 00
" " medium	25 00
" " small	$15 to 20 00

SHINGLES, LATH AND MILL WORK

Shingles XXX	$ 4 25
Clear Butts	3 25
Lath	2 75@3 00

Surfacing, one side, adds $1.25; two sides $1.50
Matching, flooring and drop sidings, $2.50.

LAKE FREIGHTS.

COAL.

Buffalo to Chicago	$.62½@.65
Toledo to Chicago	1.00
Cleveland to Chicago	70@75
Erie to Chicago	70@75
Oswego to Chicago	1.50
Fairhaven to Chicago	1.30
Buffalo to Millwaukee	70@75
Cleveland to "	70@75
Erie to Milwaukee	75
Buffalo to Racine	80
Buffalo to Kenosha	85

IRON ORE.

Marquette to Lake Erie ports	1.25
Escanaba to Lake Erie ports	90@95
Escanaba to Chicago	90@95
Marquette to Chicago	1.15@1.20

Cleveland Wholesale Prices.

HARDWARE.

Adzes.

Carpenter's	per doz $18 40
Ship	" " 18 75
Heavy railroad	" " 19 50

Axes.

Hunt's	₱ doz $ 9 50
Lippincott's Crown	₱ doz 9 00
Cut More	₱ doz 9 00
Peck's Double Bit	₱ doz 22 00
" Champion Blade	₱ doz 11 00

Anvils.

Eagle, Amer.	per lb. 10c dis 20
Wright's	10¾c@11c
Armitage's Mouse Hole	9¾@9¾c
Trenton	10¾c
Wilkinson's	10¾c

Anvil Vise and Drill.

Millers Falls Co. $28	dis 20
Cheney Anvil and Vise	dis 25&2

Vises.

Solid Box, list of July 1, '79,	dis 35
Solid "Crown" (A. H. Hildick)	40 to 100 lb. 15c net
Solid, Peter Wright's	15¾
Solid, Wilkinson's	13¾
Parallel, Parker's	dis 40
Saw Filers, Hopkins'	₱ doz $17.50, dis 10
Reading	dis 45&10
Cowell Hand Vises	dis 20
Richardson's Vise and Anvil	dis 25

Augurs and Bits.

C S cut augers	dis 40&10
do do do bits	40&10
D C gimlet do Ives	dis 50
Snells bits	dis 40
Russell Jennings' augers	dis 16⅔ &10&10
Cook's pat augur	40&10

Animal Pokes.

Berea, per doz	4 00
Eagle, per doz	5 00

Apple Parers.

Domestic & Reading	₱ doz. $7 50
Turn Table	5 00

Bolts.

Machine	dis 60
Bolt ends	dis 60
Plow	dis 50
Plow, R. B. & W	dis 40
Cast Iron Barrel Shutter, etc	dis 50&10
Cast Iron Chain (Sargent' list)	dis 60&10
Ives' Pat. Door Bolts	dis 50
Wrought Barrel	dis 55&10
Wrought Square	dis 55&10
Wr'g't Shut'r, all iron, Stanley's list	dis 50&10
Tire, R. B. & W., new list	dis 70&10
Stove, American Screw Co.'s	dis 40
Bolt Ends	dis 60

Bellows.

Blacksmith's com new list, 45 ₱ ct	
Moulder's new list, dis 25 ₱ cent	
Hand, new list, 25 per cent	

Butts.

	Dis
Wrought brass	65&10
Cast, loose joint	55
Pin, loose	50
Wrought, fast joint narrow	45
Wrought fast joint broad	45
Wrought loose joint broad	55
Wrought table and back flaps	45
Loose joint, without acorns	55

Ten per cent. extra dis for cash.

Cleveland Stamped Elbows

Genuine Russia Iron

4	inch	per doz	4 50
4½	do	do	5 50
5	do	do	7 50
5½	do	do	8 50
6	do	do	9 50
	do	do	11 00

Planished American Russia Iron

	inch,	per doz	4 00
4½	do	do	5 00
5	do	do	6 50
5½	do	do	7 50
6	do	do	8 50
	do	do	9 50

Charcoal Iron

4	inch,	per doz	2 00
4½	do	do	2 50
5	do	do	3 50
5½	do	do	4 00
	do	do	4 50
	do	do	5 50

25 per cent

Chisels.

Hot and cold cutting	₱ lb 30
Railroad track	30
Machinists	30
Mallet head	50
Tape	50
Packing	50
Stone cutters	50

Crowbars.

Cast steel	₱ lb 8¼
Iron, steel points	6¼c

Cutlery, Pocket and Table.

Meriden Cutlery Co., table	net
Am. Miller Bros.' Cutlery Co	dis 25
Humason & Beckley, pocket	33⅓
Naugatuck Cutlery Co.	list net
Aaron Berkenshaw's pocket	dis 25

Coopers' Tools.

Bradley's	dis 14@20
Barton's	dis 20

Chains.

Coil by cask,

3-16	¼	5-16	⅜	7-16	½
10⅓	9	8	7	6¼	6¼

Drills and Drill Stocks.

Blacksmiths', each	$2.50 dis 10
Blacksmiths', self-feeding, each	7.50 dis 20
Breast, P. S. & W	dis 20&10

Drawing Knives.

Witherby's	dis 65@10
Nobles Mfgr. Co	15
Adjustable handle	20

Emery and Emery Paper.

Regular Numbers	₱ lb 6c
Flour and F. F	₱ lb 4c
B. & A. Emery Paper	dis 30&5

Enameled and Tinned Ware.

Kettles	dis 50
Sauce Pans	dis 25
Tinned Sauce Pans	dis 50

Files.

Auburn	$5 to £ dis 35 pr cent
E. M. Boynton's, new list	dis 25
J. & Riley Carr	4.50 to £
Johnson & Bro	4.50 to £
Butcher's	dis 30
Walter Spencer & Co.'s "Diamond"	4.50 to £
Fisher's	4.75 to £
Moss & Gamble	4.50 to £
H. Disston & Sons (new list)	dis 40 per cent
Heller Bros.' Horse Rasps	dis 25
Nicholson	dis 40
New American	dis 40
Union File Co	dis 40

Grindstones.

Ohio	1¼@1⅝ ₱ lb
Nova Scotia	1¾@1¾ ₱ lb

Hammers.

Maydole's	dis 15
Cheney's	dis 25
Hartford Hammer Co	dis 20
Humason & Beckley	dis 50
Verree	dis 5
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75,	dis 25&10
Nelson Tool Works	dis 40&10
Warner & Noble's	dis 5
Kip's	dis 15
Yerkes & Plumb	dis 15
Wilkinson's Smiths' 11½c ₱ lb net	

Hatchets.

Yerkes & Plumb:--Shingling, Nos.	1, 2, 3,
₱ doz $7 50, $8 00, $8 50,	dis 25
Claw, Nos.	1, 2, 3,
₱ doz $8 25, $8 75, $9 25,	dis 25
Lathing, Nos.	1, 2, 3,
₱ doz $7 50, $8 00, $8 50,	dis 25

Nails.

10 to 60d	$4 00
8 and 9d	25
6 and 7d	50
4 and 5d	75
3d	1 50
2d	2 75
3d fine	3 00
2d fine	3 75
¾ inch	3 00
4d barrel	1 00
¼ inch barrel nails	1 50
⅜ do do do	1 75
½ do do do	2 50
⅝ do do do	3 00

Cut spikes, all sizes 25

Clinch nails, all sizes 1 75

Clinch nails and box nails 75 cts advance

Finishing nails, $1 25 do

Tobacco nails, 50 cts do

Nuts and Washers

Nuts, square	7c off list.
Nuts, hexagon	6c. off list.
Washers	6c off list.

Picks.

Railroad, 4 to 5 lbs	doz $7 75
5 to 6 lbs	7 75
to 7 lbs	8 50
7 to 8 lbs	9 50
Railroad Tamping Pick 7 to 8 lbs	doz 13 50
Mill Picks per lb	75c

Rivets.

Iron	dis 40
Tinned	dis 40
Copper	dis 33⅓

Squares.

	Dis
Steel or iron, case lots	50
Try squares and T bevels	40

Spikes—WROUGHT

All lengths by ¼ inch	4½c
do do do 5-16	3½
do do do ⅜, 7-16 & ½in	3¼

Shovels and Spades.

Ames' new list, July 1, 1881,	dis 15
Old Colony	dis 15
Remington's (Lowman's Patent)	dis 30
Rowland's	dis 40 and 10
Griffiths	dis 40&10

Saw Sets.

Boynton s patent X Cut, per doz $12; Hand Saw, per doz $10.	dis 20
Stillman's Genuine, per doz $3 50 and $5 50	dis 20
Stillman's Imitation, per doz $3 25	dis 20&10
Common Lever, per doz $2	dis 30&10
Leach's No. 0 $8; No. 1 $15;	dis 15
Hammer, Hotchkiss $5 50,	dis 10
" Bemis & Call Co.'s new patent	dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer	dis 30&5
Bemis & Call Co.'s Plate	dis 10
" " Cross-cut	dis 12½
Aiken's Genuine	$13, dis 50&10
" Imitation	$7, dis 50
Hart's Patent Lever	dis 20
Disston's Circular	dis 40

Sad Irons.

From 4 to 10 lbs	per lb 8¾ net
Self-Heating	₱ doz $9 net
" Tailors	₱ doz $18 net
Gleason's Shield and Toilet	dis 25
Mrs. Pott's Irons, double pointed	dis 35
Mrs. Pott's Irons, square back	dis 35
Enterprise Star Irons	dis 40
Combined Fluter and Sad Iron	₱ doz $15, dis 15

Scales.

Hatch, Counter, No. 171	₱ doz. $42, dis 37½&10
Union Platform	$6, dis 45
Fairbanks'	dis 20
Buffalo Scale Co	dis 20
Forsyth Scale Co	dis 20&5
Howe's	dis 25
Chatlilon's Eureka	dis 20&10
Family Universal	dis 50
Scale Beams	dis 33⅓&10

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.	

Planes.

Ohio Tool Co	dis 25
Sciota	dis 30
Bailey's Pat. Adjstble	dis 20@25

Rules.

Stanley	dis 66⅔ and 10

Sash Locks. Discount.

Payson Mnfg. Co. "Perfect"	42
Simmons' Sash Supporters	20

Hinges.

Champion double acting spring hinges	dis. 30
Screw & Strap 8@12 in.	$6. net
Gravity Locking Blind Hinges, Sargeant & Co.	70&10

Screws. Dis

Flat head iron or steel per cent dis	
Flat head brass	30
Round head iron or steel	30
Round head brass	25
Brass and Silver capped	20
Japanned, list of Plain Screws	40
Coach, patent Gimlet point, list per 100	20
Lag, taper points	60
Bed	60
Machine, flat head, iron	10
round head, iron	55
Bench, iron	50
wood, beech, per doz $3	55&10
wood, hickory	10

Valves. Dis.

Jenkins' Patent Gate Valves	35
" " Globe "	40
" Standard Packing "	20

Wrenches.

Coe's genuine	40 & 10
Coe's imitation wrought bar	60
Mechanics'	60 and 10

Wire.

Brass and Copper	dis 20
Bright & annealed, Nos. 0 @ 18	dis 50@52½
" " Nos. 19 @ 26	dis 60
" Nos. 27 @ 36	dis 65
Coppered Nos. 0 @ 18,	dis 45
Galvanized, Nos. 0 @ 18, market list,	dis 40@42½
Tinned, Nos. 0 @ 18,	dis 40@45
Cast steel	dis 40
Tinned Broom Wire, Nos. 18 @ 25	dis 55
Annealed Fence, Nos. 8 and 9	dis 55@52½
Annealed Grape, Nos. 10 to 14	dis 52½
Galvanized Telegraph, Nos. 7 to 9	₱ lb 7¼c
Galvanized Telegraph, Nos. 10 to 11	₱ lb 8¼c
Galvanized Telegraph, No. 12	₱ lb 10½c
Fence staples	₱ lb 5½@5¾c
Fence Staples, galvanized,	₱ lb 7@7¼c
Stubs Steel Wire	$7 00 to £
Barb Wire, painted	8¼c
Barb Wire, galvanized	9¼c
Crucible Steel Ropes from ⅜ in. at 9c to 1¼ in. at	52c
Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at	33c

Boiler Plates.

("Gaylord"--Standard Quality.)

C. No. 1	4 50
C. H. No. 1 Shell	4 75
C. H. No. 1, 50,000	5 25
C. H. No. 1, 55,000	5 75
C. H. No. 1 Flange	6 50
Firebox	6 50
T. S., 60,000	(as per) 6 50
T. S., 65,000	(act of)
Homo. Steel, 70,000 (of Cong)	7 50

Heads, ½c ₱ lb. extra.

N.B.—Eastern brands of boiler plate at from 2-10 to 3-10c ₱ lb less than above prices.

Sheet and Tank Rivets. "Norway."

All sizes	dis. 15

Boiler Rivets—"Albany."

⅛, ¼, 11-16, and ½ in. diam	5 50

Boiler Makers' Tools.

Doty's Power Shears	net list
" Hand Lever Shears	net list
" Power Punch	net list
" Hand Punch	net list
Steel Screw Punch	net list
Iron Screw Punch	net list
Boiler Plate Rolls	net list
Buffalo Forges & Blowers	dis 20
Watson's "	net list
Spring Tube Expander	dis 15
Roller Tube Expander	net list
National Tube Cleaner	dis 20
Wire Flue Brushes	net list
Anvils—"Peter Wright"	12½ ₱ lb
Solid Box Vises	net list

Nuts, Bolts, etc.

Square & Hex. Nuts	7 off list
Washers	list
Machine Bolts	dis 60
Bolt Ends	dis 60
Boiler Patch Bolts	net list

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch	dis 37½
"National" Standard Gauge 11 inch to 15 inch	dis 25
"National" Special Locomotive Tubes	net list

IRON AND STEEL.

Flat Bar.

1¼ to 4 by ⅜ to 1 inch	2 60
4¼ to 6 by ⅜ to 1 inch	2 70
1¾ to 6 by 1⅛ to 1½ inch	3 00
1¾ &1¾ by ⅜ to ¾	2 70
1 & 1¼ by ¼ to ¾	2 80
⅝ & ¾ by ⅜ to ⅝	3 00

Round.

1 to 1⅞ inch	2 60
2 to 2¾	2 80
2¾ to 3¼	3 10
3¾ to 4	3 60
4¼ to 4½	4 10
4¾ to 5	4 30

Square.

1 to 1⅞ inch	2 60
2 to 2¾	2 80
2¾ to 3¼	3 10
3¾ to 4	3 60
⅝ to ⅞	2 70

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	2 80
1 to 1¾ by ¼ and 5-16 do	2 90
⅝ to ⅞ by ¼ and 5-16 do	3 10
⅝ to 1¼ by ¼ and 5-16 do	3 60

Half Oval and Half Round.

Wagon box iron ⅜ and ⅞ 4 10

1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1¼ to 6 by ⅛ to 3-16	3 10

Hoops.

1¼ to 2 , Nos 16 to 18	3 50
1¼ to 4 do 13 to 15	3 40

1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24	4 50
No 25 to 26	4 70
No 27	4 90
No 28	5 30

English Steel.

Best cast	₱ lb 15½c
Extra cast	16¼c
Round machinery, cast	10c
Swaged, cast	18c
Best double shear	15½c
Blister, 1st quality	13c
Refined tool steel	16¾c
Spring calking	7¼@7¾c
German steel, best	11c
2d quality	10c
3d quality	9c
Sheet cast steel, 1st quality	15½c
2d quality	14¾c
3d quality	12¼c

American Steel.

Best brands of refined cast steel, ⅜ to 2 inches	12c
Crucible cast	7c
Open-hearth ditto	4¼c
Hammer cast steel	9c
Spring cast steel	7¼c
Bessemer and open-hearth spring	5c
Ditto plow	4¼c
Steel boiler plate	6¼@7c
Bessemer machinery	6@6c
Spring and calking	7¼@7¾c
Tire	5
Sleigh shoe	5

Bessemer Steel Tire.

⅝ to 1 by 3-32	4½ ₱ lb
⅝ to 1 by ⅛ to 5-32	4¾ ₱ lb
⅝ to 1 by 3-16 to ¼	4¾ ₱ lb

Miscellaneous Cast Steel.

Auger and auger bit	1
Axle steel for wagons	7
Frog points and plates	8
Frog size bars	8
Pick, hammered	8½
Mattock, beveled	10
Table cutlery	9
Trap spring steel	7½
Pike and cant hook	10
Coal and granite	9

TINNER'S STOCK.

Tin.

Banca,	per lb. 28@29c
Straits	" 25¼@25½c
English	" 25¼@25½c
Bar	" 27c

Tin Plate.

IC 12x12 charcoal	$ 6 50
IC 14x20 do	6 25@6 50
IX 14x20 do	8 25
DC 12½x17 do	6 00
DX 12½x17 do	8 00
DXX, 12½x17 do	10 00
DXXX, 12½x17 do.	12 00
IC, 20x28 do	14 50
IX, 20x28 do	15 50
IC, 14x20, Best Roof	6 00
IX, 14x20, do	8 00
IC, 20x28 do	13 00
IX, 20x28 do	14 50
IC, 10x14 Best Coke	5 75

Solder.

Half and Half, in bars	15½
No. 1 do	14½
Spelter Solder	25

Pat Planished Sheet Iron.

{A}	per lb 10½c			
{B}	9½c			
Nos	10	15	21	25
to	14	20	24	& 26
Com	3-60	3-80	4-00	4-20
Char	5-60	5-00	6-00	6-20

Sheets over 28 in. wide ½c extra

Zinc.

Sheet, cask	7½@ 7¾
Sheet, open	8@ 8½

Inners' Tools & Machines

Machines (P. S. & W.)	list add 20
Tools (P. S. & W.)	add 6

Plumbers', Steam and Gas Fitters' Supplies.

Wrought Iron Pipe	dis 60.
Steam Brass Goods	dis 45
Water "	dis 40
Enameled Pipe	di 65
Artesian Well Casing	net list
Hydraulic Tubes	net list
Malleable Iron Fittings	net list
Cast Iron Fittings	net list
Globe Valves	dis. 45
Angle Valves	dis. 35
Check Valves	dis. 35
Safety Valves	dis. 45
Ludlow Gate Valves	dis. 35
Ball Gauge Cocks (net per dozen)	dis. 20
Compression Gauge Cocks	$15
Montg'ry Gauge Cocks	dis. 35
Register Gauge Cocks (net per piece)	dis. 35
Cylinder Cocks	$1 00
Air Cocks (net per dozen)	dis. 30
Oil Cups	$2 75
Steam Gauges	dis. 30
Water Gauges	dis. 40
Scotch Glass Tubes	dis. 40
Steam Whistles	dis. 50
Pipe Tools	dis. 45
Globe, Angle and Check Valves (Star's regrinding)	special
Duplex Injectors	dis. 25
Soil Pipe & Fittings	net. 20
Sinks	dis. 20
Bath tubs &c	dis. 25
	dis. 20

Babbitt Metal.

No. 1	₱ lb 16
" 2	" 14
" 3	" 10
" 4	" 8

LEAD.

American,	₱ lb 5½c
Bar,	₱ lb 6½c dis 10 per ct
Pipe,	₱ lb 7½c dis 10 per ct
Sheet,	₱ lb 8c dis 10 per ct
Tin-lined pipe	₱ lb 15c dis 10 pr ct
Shot Drop 7c; Buck	7c
Chilled Shot	8c

COPPER.

Lake Ingot	18@18½c
Baltimore	17¾@17¾c
Arizona	17¾c

Sheathing Braziers Copper, Bolts, &c.

Brazier's Copper, ordinary sizes, 16 oz. per sq. foot, and over per lb. 30c

Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq. foot, per lb. 32c

Brazier's Copper, 10 oz and 12 oz. per sq. ft. per lb. 34c

Brazier's Copper lighter than 10 oz. per sq. ft. per lb. 36c

Circles less than 84 inches in diameter per lb. 33c

Circles 84 inches in diameter and over per lb. 30c

Segment and Pattern sheets per lb. 33c

Locomotive Fire Box sheets per lb. 30c

Sheathing Copper, over 12 oz per sq. ft. per lb. 28c

Bolt Copper per lb. 30c

Copper Bottoms per lb. 31@32c

No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

Tinning.

14x18	per sheet 6c

All other size sheets, 2½c per square foot. For tinning both sides, double the above amount.

SCRAP IRON AND OLD METAL

DEALER'S SELLING PRICES.

	Net Tons.
No. 1 wrought scrap	$24
Sheet and hoop "	10@11
Cast scrap, (No. 1 heavy)	19
Cast Scrap (Stove Plate)	12

OLD METALS.

Old copper per lb	15c
No. 1 H. Brass per lb	14
Heavy yellow Brass do	12
Light Brass per lb	12
Scrap Zinc per lb	6½
Tea Lead per lb	4
Heavy Lead per lb	3

PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas

Inside Diameter. Inches.	Plain, Price Per Foot.	Galvan. or Enameled Per Foot.	Outside Diameter Inches.	Weight Per Foot.
⅛	08		.40	.24
¼	08	$0 11	.54	.42
⅜	09	12	.67	.56
½	11	15	.84	.85
¾	13½	19	1.05	1.13
1	19	28	1.31	1.67
1¼	27	40	1.66	2.26
1½	33	47	1.90	2.69
2	46	64	2.37	3.66
2½	75	1 00	2.87	5.77
3	95	1 30	3.50	7.55
3½	1 25	1 70	4 00	9.05
4	1 50	2 05	4.50	10.73
4½	1 75	2 40	5.00	12.49
5	2 25	3 00	5.56	14.56
6	2 75	4 00	6.62	18.76
7	3 75	....	7.62	23.00
8	4 75	....	8.62	28.00
9	6 50	....	9.68	34.40
10	8 00	....	10.75	40.64
12	12 00	....		54.65

Discount, 63⅓ per cent; galvanized, 62½ per cent.

BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb.

High Brass.

All Nos not thinner than to No. 28, wider than 2 in. not wider than 14 inch	30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive	35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in. inclusive	38c

¼c per lb. advance on each No. above Nos. 28 to 38, inclusive.

All Brass thinner than No. 8 is Platers' Brass at	38c

Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches .37c

Low Brass.

4c per lb. more than High Brass.

Gilding metal 8c per lb. more than High Brass.

Platers' or Gold Metal

In Bars	48c
Sawed	51c
Planed or Polished	54c

For Slitting.

Metal in width in. to ½ in. to No. 28, inclusive, 1c per lb advance.

Metal, in width 2 in. to 1 in., thinner than No. 28, 2c per lb. advance

Metal, in width ½ in. to ¼ in. thinner than No. 28, 5c per lb. advance.

Metal ¼ in. in width and less, 10c per lb. advance.

Any of the above widths cut to particular lengths, add 7c per pound.

COAL,

WHOLESALE.

Wholesale f.o.b. vessel at Cleveland:

Carbon Hill and Monday Creek	
Massillon	$2 65
Brier Hill	2.75@ 2.85
Pittsburgh	3 25@3 75
Salineville	3 00
Tuscarawas	2 25
	2 25

RETAIL.—Delivered.

Massillon Lump	$4 00
" Nut	3 75
Carbon Hill and Monday Creek, lump	3 75
Carbon Hill and Monday Creek, nut	3 50

75c less on cars by car load.

Anthracite Stove and Chestnut	7 15
Egg and grate	6 00

GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

6x8 to 10x15	
11x14 to 15x24	
16x24 to 20x28	8 50
15x34 to 24x30	9 75
26x28 to 24x36	10 75
26x36 to 26x44	11 50
26x46 to 30x50	13
	14 00

DOUBLE THICKNESS

6x8 to 10x15	11 7
11x14 to 15x24	13 25
16x24 to 20x28	15 75
15x34 to 24x30	17 25
26x28 to 24x36	18 50
26x36 to 26x44	21 25
30x50	22 50
30x52 to 30x54	23 25
30x56 to 34x56	25 00
34x58 to 34x60	27 75
36x60 to 40x60	30 00

Dis 60 & 15 single, 60 & 20 double

OILS.

Pure Oils. packages included	
Sperm, winter bleached per gal	1 25
Whale, winter bleached per gal	63
Straits	50@53
"A" oil for tanner's use	35 @40
Lard oil extra W S	1 03@1 10
do No 1 do	82@87
do No 2 do	72@77
Tallow oil	75
Neatsfoot oil pure	90@95
do No 1	80@85
Linseed oil, raw	57
do do boiled	60
Cotton seed oil white	64 @ 66
do do yellow	60 @ 63
West Virginia lubricating 28 deg	20c@20c
Pure Mecca	55@ 50
Paraffine oil winter pressed	25@ 30
Machinery	40
Engine	50
Miners' oil	40@45
Drilling oil	40

Hides and Leather.

Prime cured hides,	8¾@9
Green hides	5@6
Bull, scrubby, badly scored or damaged, cured, two-thirds price.	
Prime dry hides	13@14
Horse hides, green	No. 1, $2 60
Prime cured veal calf,	12@12½
Ohio Deacon S, salted	60
Pelts, wool on	25@30
Fresh slaughter sheep	90@$1 50
Fresh slaughter lambs	50@60
Green calf skins	13
Hemlock rough	23@24
Oak harness	34@38
Oak sole	37@4
Union harness	31@3

MERCHANT & COMPANY,

Manufacturers of

SOLDER,

525 Arch St., Philadelphia.

WE ASK THE PATRONAGE OF THE TRADE FOR OUR SOLDER FOR THE FOLLOWING REASONS:

1st.—All our Solder is made on our premises and under our personal supervision.

2nd.—We guarantee proportions specified or do not require payment.

3rd.—We use nothing but best selected brands of new Lead and Pig Tin.

4th.—We do not use animony or any other metal to dress up the face of Solder.

5th.—We offer to make any specified mixture of Tin and Lead, guaranteeing same.

6th.—That we believe the question between manufacturer and consumer of Solder is not so much price as quality.

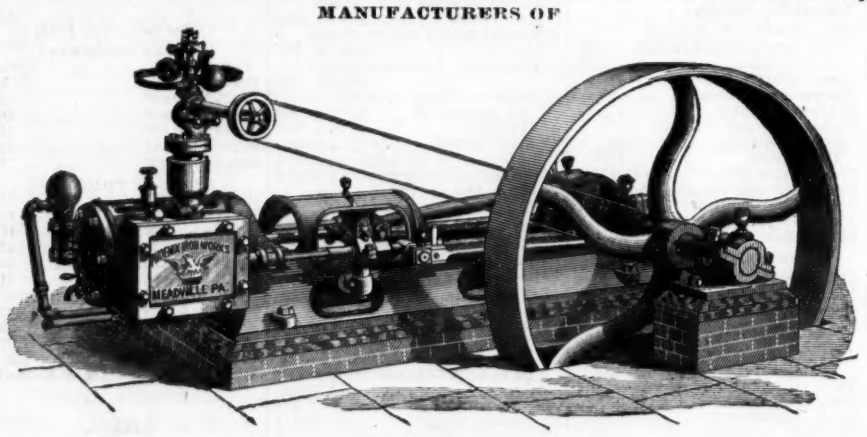
7th.—That we believe our M. F. Solder is the best ever offered to the trade, and cannot be surpassed.

8th.—That we guarantee our prices as low for same quality as any house in the country

MERCHANT & CO.

PHŒNIX IRON WORKS,

MANUFACTURERS OF



Portable and Stationary Engines, Boilers, and Circular Saw Mills.

MEADVILLE, PA.

The American Tool and Machine Company.,

84 Kingston street, Boston Mass.,

—Manufacturers of the—

Celebrated Cabinet Turret, Screw Chasing, and Hand Lathes,

CHUCK'S SLIDE RESTS

And Valve Milling Machines for Brass Finishers.

Also the D. M. Weston Hydro Extractors

For Woolen and Cotton Mills, Hotels, Laundries, etc.

BENJAMIN F. RADFORD, Sup't.

Dayton Malleable Iron Co.,

Manufacturers of

Air Furnace Iron.

A full line of Carriage and Plow Hardware kept in stock.

☞Catalogues for the Trade.

Engines, Hoisting Machines

And General Machinery.

EXTRA HEAVY STEAM ENGINES and other machinery adapted for Rolling Mills, Forges, Mines, &c., specially designed to suit local requirements.

Light and Heavy Hoisting Machinery

of every description, adapted for either slow or rapid hoisting, and with or without Friction Clutches or Steam boilers, &c. I am now prepared to manufacture my recently designed

FRICTION BAND HOIST,

Specially designed for rapid hoisting, which for cheapness, simplicity, driving capacity, ease and reliability of operation will be found superior to any other hoisting machine in the market. Patterns changed or new patterns made in any case to suit local requirements.

To parties wishing to build newly designed machinery I give especial attention. Designs and estimates for machinery, as a base for negotiations, forwarded on application. Promptitude guaranteed. Correspondence solicited.

W. H. THOMPSON,
Phœnix Iron Works, Wason Street, Cleveland, Ohio.

Freight and Passenger

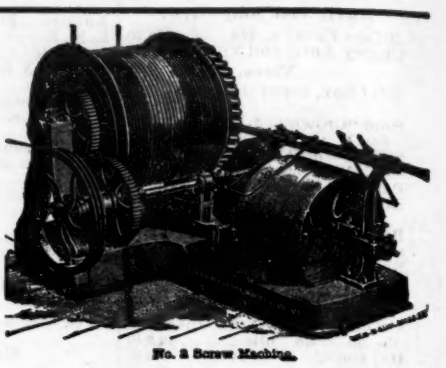
Elevators.

L. S. GRAVES & SON,

Cor. Center and Frank Streets,

ROCHESTER, N. Y.

end for our Catalogue.



No. 3 Screw Machine.

Glazed Windows.

CLEVELAND WINDOW GLASS CO.

For Doors, Sash, Blinds and Windows,

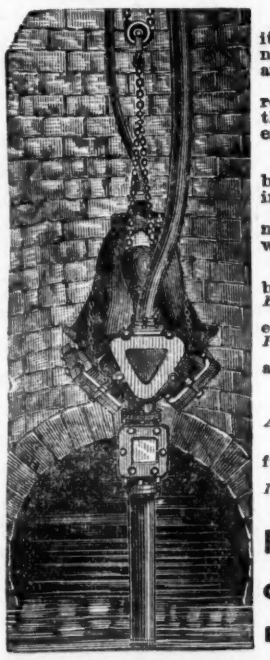
American, French & Plate Glass

73 Michigan Street and 132 Champlain Street.

Cleveland, Ohio.

THE NEW PULSOMETER

As a Contractor's, Well Sinker's and Sewage Pump has no equal.



It is available in many cases where no other pump could possibly be used.

Its ability to raise sand, mud, and other substances without injury to its parts, its small cost and size, which allows it to be squeezed into narrow and confined spaces, and general handiness suggests its adoption, and has already established its reputation.

The annexed cut shows how it should be slung either with a chain or rope, by which it can be lowered as the work progresses. To facilitate the changing adjustment, a short piece of steam hose should be used either at the Pump or at the top of shaft.

The discharge pipe can be lengthened as the pump is lowered.

The capability of this Pump to deal successfully with mud from the bottom of rivers and sewage matter, has rendered it especially serviceable in important works of this kind.

It may be placed at a distance from the boiler operating it, it being only necessary to run a larger size steam pipe, and protecting it from the weather with some non-conducting substance.

"A most excellent pump; can be hung in a tripod, and be raised and lowered by tackle, as conditions may require; uses steam very economically."—*Chicago, Burlington & Quincy R. R.*

"It worked to our entire satisfaction, throwing mud or water with equal ease; is as easy to run as a canal pump."—*Pompton Steel and Iron Co., Pompton, N. J.*

"In ease of management, economy of fuel and durability it seems without an equal."—*Bay State Brick Co., North Cambridge, Mass.*

"The best steam pump I ever used."—*Timothy Shea, Spencer, Mass.*

"We found it very efficient and satisfactory."—*Pennsylvania Steel Co., Steelton, Pa.*

"It is doing work that other pumps failed to do."—*Union Dredging Co., 83 & 84 Astor House, New York.*

"It gives us perfect satisfaction."—*McKiernan & Bergin, Paterson, N. J.*

"Is the admiration of all who inspect it. It throws water regularly, plentifully and easily."—*Golding & Co., Hockessin, Del.*

"In steady operation for two months and works very satisfactory."—*Logan Iron and Steel Works, Lewistown, Pa.*

Descriptive book with prices and testimonials mailed upon application to

PULSOMETER STEAM PUMP CO.,

83 JOHN STREET, NEW YORK, or to

CHICAGO OFFICE, 193 Lake Street,

FRANK GRAY, Manager.

BOSTON OFFICE, 32 Charlestown Street,

S. B. EVERETT, Manager.

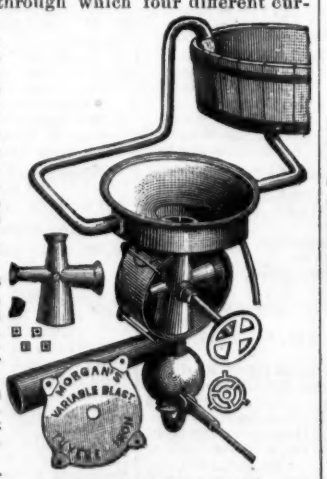
THE MORGAN

Variable Blast Water Tuyere Iron.

With the front plate removed, showing the rotating air tubes through which four different currents of air may be passed thereby making any sized fire from two to eighteen in. diameter.

It actually saves one-half of the coal; makes an intense heat just where it is needed, and burns no coal unnecessarily Always gives a centre blast, and cleans all the dirt from the fire. Supplies hot water

We also furnish a Tuyere on same principle without Water Attachment. All goods guaranteed to please or no sale. Catalogue sent free. Address,



A. W. MORGAN & CO.
52 Vance Block, Indianapolis, Ind.

COATES'

"Independent Lock Lever"

HAY AND GRAIN RAKE.

Patented August, 1867, January. 1875, June, 1875, and November, 1876. 60,000 now in use. Light touch of lever and driver's weight dumps it. Best self-dump in market. Twenty steel teeth. No complicated ratchet wheels, friction bands or other horse machinery needed to operate it. A small boy rakes easily twenty acres per day with the Coates' Lock Lever. Send for circulars.

A. W. COATES & CO.
Alliance, Ohio.

Cleveland Business Directory.

Assayers and Analytical Chemists.

JUDSON, W, E, Ana ytical Chemist, 8 Cushing Block.

Bolt and Nut Works.

HOTCHKISS & GAYLORD, manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws.

Boiler Makers.

SMITH & TEACHOUT—(Established 1857.) Boiler, Tanks, Stills etc. 429 Broadway.

Bridge Builders.

BUCKEYE BRIDGE AND BOILER WORKS mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

Coal and Iron Exchange.

JACKSON IRON CO. Iron Ore and Pig Iron. Rooms 8 and 9. Fayette Brown, Gen. Agent.

RHODES & CO. Coal, Iron Ore an Pig Iron. Rooms 1 and 2.

Carriage Blacksmith.

STRIEBEL, CHAS. manfac'r. of Carriages and Wagons and platform trucks. Horse shoeing and general blacksmithing .93 Woodland ave.

Carriage Bolts.

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts.

Church and School Furnture.

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. 203 Ontario Street.

Custom Boots and Shoes.

ROONEY, JOHN manufacturer of hand-made Boots & Shoes, custom made and warranted 177 Ontario Street.

Carriage Repository.

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection.

SLATER, G. A., Carriage dealer, sells the best work for the lowest price. A fine assortment always on hand. Repository 365 Euclid Avenue.

Coal and Pig Iron.

ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 122 Water Street.

Electrical,

ELECTRIC SUPPLY CO. manfrs and dealers in Electric Burglar Alarms, Annunciators, Cell Bells and Batteries. Telephone lines built and repaired. 145 Seneca Street.

Fresco Artists.

KEMMER & KUSHMAN DECORATIVE CO., Fresco Artists, Fine Modern Wall Papers. 138 Euclid ave.

Foundries.

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins.

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st.

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way.

VIADUCT FOUNDRY COM'Y, Acme, Carlin & Strangward manfrs of Machinery Castings Fine Light Castings a Specialty. Office & Works 11 13 15 and 17 Detroit Strert, near Center.

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway.

File and Saw Works.

PARKIN, W. H. & CO., Hand-cut Files and Rasps, dealers in Disston's saws, 11 So. Water

Flue Cleaner.

CLEVELAND FLUE CLEANER M'F'G. CO. manufacturer of Aitchison & Doolittle's Patent Steam Flue Cleaner, 22 & 24 Power Block.

Hotels.

FOREST CITY HOUSE, cor. Public Square and Superior st., Terrill & Ingersoll, Props.

KENNARD HOUSE, D. McClasky, Prop.

NEW ENGLAND HOTEL, Water st., W. W. Wolcott, Prop. Refitted and refurnished.

STRIEBINGER HOUSE, between Ontario and Seneca sts. $2.00 per day. Hawley & Langton

CITY HOTEL, Seneca street. H. B. West, proprietor. $1.50 per day.

Hides, Pelts and Leather.

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow, 48 and 50 River street.,

Hardwood Lumber.

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way.

Lumber.

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st.

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed umber, timber, lath, shingles, etc. 47 Central Way

KRAUSE, C. A., & SON, wholesale and retail dealers in lumber. Yards cor. Superior and Wason and 281 Merwin streets.

Cleveland Business Directory.

Hardware and Iron.

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manuf'rs. of Steel and Iron Wire and Steel Tire.

WORTHINGTON, GEO. & CO., Hardware and Dealers in Metals, Water street.

Lime Manufacturers.

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street.

Machinery and Boilers.

CLEVELAND STEAM FURNACE CO., Engines and Boilers, cor. Detroit and Center sts.

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street.

Machinery Depot.

CLEVELAND MACHINERY DEPOT, (now National Machinery Depot.) The largest stock of New and Second-hand Engines, Boilers and Machinists' Tools. Shop and Warehouse corner Bond and Superior streets.

Mercantile Agency.

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

Oil Manufacturers.

AMERICAN LUBRICATING OIL CO., manufacturers of lubricating oils, 23 Euclid ave.

Pattern and Model Makers.

WHITTINGHAM, J. & C., Metal Pattern and Model makers. 52 Canal Street.

REID, J. C., Pattern and Model Maker. 52 Canal Street., (Up Stairs.)

COTTRELL & CO., W. L., Pattern Makers, 53 Center street.

STAIR BUILDER.

PFEIL, CHAS, Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio.

JOHNSON & PURSER, Stair Builders, and manuf'rs of Mantels, Odd Pieces of Furniture, &c. 30 West street, up stairs.

Steel Stamps and Stencils.

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street.

Steam Furnaces.

CUYAHOGA STEAM FURNACE CO., Manfrs of Land and Marine Engines. Machinery for Blast Furnaces, Rolling Mills, Bessemer Steel Works, &c. Mill-Gearing and all kinds of Castings, Foundry, Machine and Boiler Shops.

Trunks and Valices.

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample Trunks and Cases a Specialty. 56 Public Square.

Vessel Agents.

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street.

Wood Carving.

HERKOMMER, J., Carver and Ornamenter in Composition. 225 Erie street.

Business Directory.

Akron, O.

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

CASCADE HOUSE, cor. Mill and Summit sts., near Depot. J. Downie, Prop.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

PERKINS, C. E., dealer in Agricultural Implements, machinery, and Manufacturers' Ag'nt

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc.

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street.

AKRON POLISHING & PLATING WORKS. Man'f'rs of solid leather wheels for polishers.

Alliance, O.

ARLINGTON HOUSE, cor. Main and Liberty Streets. Centrally located. Sample Room for Commercial Travellers. H. S. Adams, proprietor

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing.

Buffalo, N. Y.

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot and power lathes. 70 Columbia street.

EMPIRE STATE MF'G CO., O. F. Swift, prop'r. manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio

WHITE, L. & I, J. manf'r's of Coopers' Tools, Carpenters' Tools, and Ship Tools. Also manf'r's of Planer Knives and Machine Cutters to order 310, 312, 314 Exchange street.

THE BUFFALO NUT AND BOLT CO. [Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. No. 226 Ohio Street.

Cuyahoga Falls, O.

THOMAS BROTHERS, manfrs of Ohio Stone Ware. Cuyahoga Falls Stone Ware Factory, cor. Main and Broad streets,

TURNER, VAUGHN & TAYLOR, manufacture engines, presses and grinding machinery for clay; also paper, chain, wire and flour mill machinery. Send for Circulars and price list.

SNYDER, H. wholesale manu acturer of Sash, Doors, Blinds, &c. Send for Price Lists.

THE CUYAHOGA FORGE AND IRON CO., manfrs. of every description Car, Truck and Driving Axles, Forging, Shafting, &c.

Business Directory.

Canal Dover, O.

HECKMAN, E., manufr. and dealer in harness leather, upper, kipp and calf. Also, manufacturer & dealer in prime English Dairy cheese. Highest market cash price paid for hides.

Columbus, O.

PAT. ADJUSTABLE WINDOW CURTAIN Cornice, manufactured by Strader's Curtain Cornice Works.

ROYCE & PULLING manufrs of Patent Steam Pumps for all purposes. Store room 30 High street. Works Nos. 5 and 7 Scioto street.

U. S. CARRIAGE CO. builders of fine Carriages, Buggies and Phætons. Salesrooms and Office 257, 259 and 261 Fourth street.

REYNOLDS BROS., manufacturers of hand-cut Files and Rasps. Old files re-cut. Send for Price List.

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co.

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets.

Canton, O.

DIEBOLD SAFE & LOCK CO., manuf'rs. Safes, Locks, Bank and Safe Deposit Works.

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc

NEW AMERICAN HOUSE, Canton. Fred. Hipp, Prop.

EBERSOLE & KAILEY, Machine and Jobbing Shops. Gearing for Patterns or Machinery a specialty. Models of all kinds made & repaired.

Erie, Pa.

GUNNISON, A. B., wholesale manufacturer of Wood Pumps. 233 East Twenty-Second St.

BALL ENGINE CO., limited, manufacturers of Automatic Engines of 15 to 30 horse power

NOBLE SEWING MACHINE CO. manfrs of the New Noble Sewing Machine. Send for circulars and prices.

A. B. FELGEMAKER & CO. Church Organ builders. Descriptive catalogue furnished on application.

Geneva, O.

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty.

Louisville, Ky,

HAIGHT, ROBERT. Gold, Silver and Nickel Plating and Brass Finishing Shop. Car Trimmings and Steamboat work a specialty. 1 West Market street

Lima, O.

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

Massillon, O.

CITY CARRIAGE WORKS, P. H. Young, prop. manfact'r of Carriages, Phætons and Spring Wagons. Work warranted. Cor. Tremont & Erie.

Meadville, Pa.

CURRY & CO. general jobbers in Castings of al kinds.

Olean, N. Y.

MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc.

Oil City, Pa.

REID, JOS. Machinist, steam engine and pump repairing. Brass and iron castings, light and heavy, made on short notice.

Pittsburgh, Pa.

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42½ Sixth Street. [Up stairs.]

BAIR & GAZZAM, practical machinists; gear cutting a specialty. Rice's Feed Water and Heater. 17 Wood street, corner First Avenue.

Painesville, O.

NORTH AMERICAN CUTLERY CO., m'fr's of Steel Shears and Scissors—best quality.

Ravenna, O.

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect sts.

BALDWIN, D. L. & SON, Contractors & Builders and manfrs of all kinds of Moulding, flooring, siding, &c. Rip, Band and Scroll Sawing.

Rheims, N. Y.

GREAT WESTERN CHAMPAGNE. Finest made in America. Equal to best imported. Has taken highest awards everywhere, and is used all over the Continent. Try a case, and you will have no other. Pleasant Valley Wine Co., Rheims, N. Y.

Rochester, N. Y.

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c.

ELEVATORS for Hotels, Factories and Private Houses. J. S. GRAHAM & CO.

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. GRAHAM & CO.

RAZOR STROPS. Sole mfrs. of all kinds of Razor Strops. Uischt, Linn & Co. 131 N. Water

Business Directory.

Rochester, Pa,

OLIVE STOVE WORKS, (limited) manufacturers of Stoves and Hollow Ware.

Steubenville, O.

DORRANCE, D.W., Tool Works, manufacturer of hand-made miners' and stone-cutters' Tools. Promp attention given to mail orders.

Sandusky, O.

SANDUSKY WHEEL CO. manfrs. of Sarven Patent Wheels, Carriage Bodies and Seats, Plain Wood Hub Wheels, Banded Hub Wheels, Jacobs' Patent Neck Yokes.

Sandy Lake, Pa.

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List.

Titusville, Pa.

FOSTER & McKAY, dealers in boilers and engines, tubing, casing, old iron, rope, and all kinds of metals. Washington street, nr. Railroad.

Toledo, O.

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street.

TOLEDO FOUNDRY AND MACHINE CO. builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry

RUSSELL IRON WORKS, mnfrs. of Architectural Iron Work, castings, pulleys, shafting and steam bending machinery. Cor. Water and Lagrange streets.

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description. All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss Springs, &c. made to order. 92 St. Clair Street.

UNION Wooden Ware Manufacturing Co. manufacture Sewing machines, washboards, children's wagons, carts, wheelbarrows, sleds, kitchen wooden ware, &c.

HEPBURN BROTHERS, proprie. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street foot of Cherry.

Union City, Ind.

LAMBERT, J. W. & CO., mfrs of fork, rake, hoe and broom handles; spokes, hubs, whiffletrees, yokes, plow-rounds. &c. Correspondence solicited.

Wheeling, W. Va.

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pullies, Shafting, &c. Cor. 18th & Chapline streets.

Youngstown, O.

BELL, EDWIN & SON, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock.

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath.

MORTON HOUSE, formerly Maitland House, James Morton, Prop.

TOD HOUSE, cor. Diamond and Market streets. Henkel & Bowman, Props.

Zanesville, O.

KIRK HOUSE, William Kirk, proprietor. $1.50 per day.

Brattleboro', Vt,

A JOY FOREVER!
ESTEY ORGANS
Manufactured by
J. ESTEY & CO.,
Brattleboro', Vt.
(Catalogue free on app'lication.)

CLEVELAND
NON-CONDUCTING CO.
MANUFACTURERS & DEALERS IN
ASBESTOS, HAIR FELT,
CEMENT, & OTHER
Pipe Coverings,
19 SOUTH WATER STREET,
CLEVELAND, OHIO.

F. I. FREEMAN, Prop. JAS. GILLETT, Supt.
Ætna Machine Works.
Manufacturer of
Steam Engines,
Geared and Direct Attachment Circular Saw Mills, Steam Pumps,
IRON AND BRASS CASTINGS,
And Machinery of all description.
Prompt Attention given to Repair Work.
Also dealer in Gas and Pipe Fittings, Globe Valves, and
Second-hand Machinery of all kinds.
Parties wishing to buy or sell second-hand Machinery will do well to call.
orner Vernon and Hudson Streets, opposite the N. Y. P. & O Freight Depot,
WARREN, OHIO.

TRAVELERS' REGISTER.

Lake Shore & Michigan Southern.

Trains marked with a * are the only trains that arrive and depart in this city on Sundays.

ARRIVALS.	a.m.	a.m.	p.m.	p.m.
Through from East	*2 50	*6 35	1 25	*1 40
Through from East	....	....	....	*7 05
N. Y. & Chicago Ex	....	12 23	....	....
Conneaut Accommoda'n	8 40	....	....	....
Nottingham Accom'd'n	‡10 05	....	14 45	....
Elyria Accommodation	8 50	....	....	....
From West via Sandusky	*7 05	11 09	....	10 12
Fast Express	*1 35	....	....	....
From West via Norwalk	....	11 00	2 25	10 10
Pt. Clinton Accom'dat'n	....	11 00	....	....

DEPARTURES.	a.m.	a.m.	p.m.	p.m.
Through Eastern Train	*7 30	11 15	*2 55	10 35
Fast N. Y. Express	*1 50	....	....	....
Conneaut Accommod'n	....	....	4 50	....
Nottingham Accom'd'n	‡9 00	....	12 15	....
Elyria Accommodation	....	....	5 00	....
West via Norwalk	6 40	....	3 30	*7 35
West via Sandusky	3 05	7 00	*2 05	5 00
N. Y. & Chicago Ex	....	12 33	....	....
Pt. Clinton Accom'dat'n	....	....	5 00	....

Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'pous Ex	*7 10 A.M
No. 8 C. T.V. & W. & Clev Accom	10 30
No. 12 St. Louis & New York Exp	*3 00 P.M
No 6 Indianapolis & Columbus Exp	10 20
No. 10 Wheeling & Cleveland Exp	7 15
No. 4 Special Cin. & New York Exp	*3 40

DEPARTURES.

No. 1 Cincinnati & Columbus Exp	8 00 A.M
No. 11 Cleve, Indianap. & Wheel'g Ex	7 10
No. 3 Special St. Louis & Cincinnati Ex	1 55 P.M
No. 5 Night Express	*7 25
No. 7 C.T.V. & W. & Col. Accom	4 00

†This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.

Wheeling & Cleveland Express	8 25 P.M
Uhrichsville Express	10 30 A.M

DEPARTURES.

Wheeling & Cleveland Express	7 15 A.M
Uhrichsville Express	4 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.

No. 7 Mahoning Valley Accommo	10 55 A.M
No. 3 New York Express	*7 00 P.M
No. 1 New York Express	6 50 A.M
No. 3 Pittsburgh Express	*7 00 P.M
No. 5 Pittsburgh Express	2 00
New York Express	2 00
No. 9 Youngstown and Pitts. Local	10 15

DEPARTURES.

No. 12 New York Express	*7 10 A.M
No. 4 Youngstown Local	11 00
No. 8 Mahoning Accommodation	4 25 P.M
No. 2 New York Express	10 45
No. 12 Pittsburgh Express	*7 10 A.M
No. 6 Pittsburgh & Main Line Express	2 30 P.M

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Pittsburg & Wheeling	1 45 P.M	8 50 A.M
Express	6 55	2 30 P.M
Alliance Accommodation	10 15 A.M	3 45
Ravenna Accommodation	8 35	5 35
Night Express	6 30 A.M	‡11 40 P.M

‡ Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

ARRIVE.	DEPARTURES.
No. 2 Accom... 10 15 A.M	No. 1 Mail ... 8 15 A.M
No. 6 Express... 1 35 P.M	No. 3 Accom. 2 30 P.M
No. 4 Mail ... 6 30 P.M	No. 5 Exp.... 6 05

Special trains leave on Sunday at 8.30 A. M. and 4.20 P. M., arriving at Cleveland at 10 A. M. and 6.25 P. M.

Trains leave from Depot foot of South Water Street.

Connotton Valley Railway.

Arrive.	Depart.
No. 1 ... 10 05 A.M	No. 4 ... 10 05 A.M
No. 3 ... 4 00 P.M	No. 2 ... 4 40 P.M

All trains arrive and leave depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad,

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Railroad to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	1 15 P.M	8 00 A.M
Express	7 25	1 50 P.M
Accommodation	10 10 A.M	3 45 P.M

CLEVELAND & PITTSBURGH

RAILROAD.

Trains leave Cleveland and arrive at the points named below as follows: Night Express runs daily, all other trains dail \except Sundays.

	Mail.	Fast Line.	Accom.	Night Expr'ss.
Leave Cleveland	8 50 am	2 30 pm	3 45 pm	11 40 pm
Arrive Hudson	10 00	3 23	4 50	12 50 am
Ravenna	10 40	3 53	5 50	1 18
Alliance	11 25	4 25	6 05 pm	2 05
N. Philadel	11 35 pm	7 15	....	10 55
Salem	12 25	....	....	3 02
Canton	12 28	5 47	....	3 20
Massillon via Alliance	12 50	6 06	....	3 38
Akron	10 42 am	4 10	5 40 pm	....
Pittsburgh	3 30 pm	7 45	....	6 55
Wheeling	5 10	8 00	....	8 55
Marietta	8 45	....	....	....
Harrisburg	....	4 15 am	....	4 00 pm
Philadelphia	....	7 50	....	7 35
New York	....	11 15	....	10 35
Baltimore	....	7 55	....	7 20
Washington	....	9 17	....	8 47
Boston	....	8 00 pm	....	....

Ravenna Accommodation leaves Cleveland at 5:30 p m, reaching Ravenna at 7:15 p m; Akron 7:23 p m.

Newburgh Accommodations leave Cleveland at 11:00 a m and 12:30 pm. Returning, leave Newburgh at 11:10 am and 1:30 pm.

Passengers for New York, Philadelphia, Baltimore, Washington, and all points east of Pittsburgh make but one chang of cars, viz. at Union Depot, Pittsburgh, excepting those leaving on the Fast Line which has Pullman Sleepers from Cleveland to Philadelphia and New York.

The Fast Line leaving at 2:30 P. M. has elegant Pullman Palace Sleeping Cars through from Cleveland to New York without change. Pittsburgh Passengers who desire Parlor Car accommodations can secure seats in this car.

The Night Express has Pullman Sleeping Cars from Cleveland to Pittsburgh which can be occupied by passengers at Union Depot, Cleveland, any time after 9:00 P. M. At Pittsburgh passengers can take elegant through Parlor or Sleeping Cars for the East.

Sleeping and Parlor Car accommodations from Cleveland and Pittsburgh eastward can be secured at the Union Sleeping and Parlor Car Office Union Passenger Depot; of H. C. Marshall, Union Ticket Office, Weddell House; or of the Ticket Agent at the Euclid Avenue Station.

Through tickets can also be secured at the same points. Baggage checked through from the Union Depot or from Euclid Avenue Station,

By the 8:50 A. M. train a through car leaves daily for Akron, Gambier, Mt. Vernon, Columbus and immediate points, without change.

The 2:30 P. M. train has through car for Akron, Orrville, Columbus and immediate points, arriving in Columbus at 9:25 P. M.

By the 3:45 P. M. Accommodation train cars run through without change from Cleveland to Cuyahoga Falls, Akron and Millersburgh,

Night Express leaving Cleveland at 11:40 P. M., runs daily, and makes connection at Wellsville for Steubenville, Bridgeport, Wheeling, Bellaire and intermediate points. Every night in the week except Saturday the night express runs via Wellsville. On Saturday nights it runs via Alliance. All other trains run daily except Sunday.

Trains arrive at Cleveland.—Night Express at 6:30 P. M., having Pullman Sleeper from Pittsburgh; Ravenna Accommodation, 8:35 A. M., Alliance Accommodation, 10:15 A. M.; New York Wheeling & Washington Mail, with Pullman Sleeping Car from New York and Philadelphia, 1:45 P. M.; New York, Philadelphia & Wheeling Express, 6:55 P. M.

WM. A. BALDWIN, General Manager. **E. A. FORD,** Gen'l Pass. & Tkt. Agt. Pittsburgh, Pa.

C. L. KIMBALL, District Passenger Agent, corner Bank and St. Clair streets, Cleveland.

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VIA THE

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Formerly Atlantic & Great Western Railroad.]

For New York, Boston and the East. The shortest and quickest route to Pittsburgh, Washington, Baltimore and the Southeast

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

7:10A.M. LIGHTNING EXPRESS, (daily,) sleeping and hotel coaches from Leavittsburg. 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p.m.; Buffalo, 6:15 p.m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p.m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

10:45 P.M. NIGHT EXPRESS, (daily except Sunday), Sleeping Coach from Leavittsburg to New York without change. Arrives at Youngstown 1:45 a.m.; Meadville, 3:50 a.m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a.m.; Rochester, 1:10 p.m.; Hornellsville, 11:20 a.m.; Corning, 12:53 p.m.; Elmira, 1:21 p.m.; Binghampton, 2:50 p.m.; New York, 9:25 p.m.

2:30 P.M. PITTSBURGH EXPRESS,—daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:15 a.m.; via Sharon and Sharpsville to Meadville 7:40 p.m.; Corry, 9:10 p.m.; Lakewood, 9:50 p.m.; Jamestown, 10:00 p.m.; Salamanca, 11:10 p.m.

4:25 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p.m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p.m.

7:10 A.M. PITTSBURGH EXPRESS,—(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:18 p.m. and 4:20 p.m.

11:00 A.M. YOUNGSTOWN & PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 10:55 a.m. 2:00, p.m. 7:00 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

Baggage Checked Through to All Points East

☞ Through Tickets and information regarding the route can be obtained at the Union Ticket Office, corner Bank and Superior streets; at office 131 Bank street, and at new Depot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK,
Gen. Pass'r. Agt., Cleveland, Ohio.

P. D. COOPER, Gen. Man'gr, Cleveland

M. L. FOUTS, Pass. Agt., 131 Bank st., Cleveland.

NOTICE.—Hereafter all Passes must be returned to the General Passenger Agent within FIVE DAYS after date of expiration; otherwise they will be discontinued.

Blue Grass Route of Ohio

TIME TABLE.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

SOUTH-BOUND TRAINS.

STATIONS.	Accom	Accom	Expr	Mail	Sundays only
Leave.	P. M.	P. M.	P. M.	A.M.	P.M.
Cleveland	5.30	3.45	2.30	8.50	....
Hudson	6 53	5.02	3.35	10.10	4 20
Cuyahoga Falls	7.11	5.30	3.53	10.29	4 40
Akron	7.23	5.46	4.10	10.42	5 00
*North Portage	P.M.	6.00	4 24	10.54*	6 14
Clinton	....	6 19	4.44	11.09	5 31
Warwick	....	6 29	4.49	11.14	5 37
*Marshallville	....	6.43	5.02	11.27*	5 50
Orrville	....	6 58	5.14	11.42	6 02
*Apple Creek	....	7.17	5.32	11.58*	6 22
Fredricksburg	....	7.32	5.45	12.11	6 37
*Holmesville	....	7.43	5 55	12.21*	6 48
Millersburg	Accom	7.55	6.08	12.34	7 00
	A. M.	P.M.			A.M.
Millersburg	5.50	....	6.08	12.34	7 00
*Killbuck	6.02	....	6.20	12.47*	7 12
*Black Creek	6.13	....	6.31	12.59*	7 25
Gann	6.33 b 6.53	....	6.51 7.11 s	1.19	7 47
Danville	7 04	....	7.20	1.29	7 59
Howard	7.13	....	7.29	1.38	8 10
Gambier	7.22	....	7.38	1.47	8 20
Mt. Vernon	7.35	....	7.51	2.00	8 33
*Bangs	7.45	....	8 01	2.11*	8 45
*Mt. Liberty	7.53	....	8.09	2.20*	8 54
Centerburg	8.05	....	8.18	2.30	9 05
*Condit	8.19	....	8.32	2.44*	9 19
*Sunbury	8.27	....	8.40	2.53*	9 28
*Galena	8.32	....	8.45	2.58*	9 34
Westerville	8.48	....	9.00	3 15	9 50
Arrive at Columbus	9.15	....	9.25	3.40	10 20
	A.M		P M.	P.M.	A.M

NORTH-BOUND TRAINS.

STATIONS.	Expr	Mail	Accom	Accom	Sundays only
Arrive at	P. M	P. M	A. M.	A. M.	A.M.
Cleveland	1 45	6 55	10.15	8.20	....
Hudson	12.35	5.48	8.53	7.15	10.30
Cuyahoga Falls	12.16	5 30	8.33	6.58	10.11
Akron	12.03	5.17	8.20	6.45	9.50
*North Portage	11.46	5.00*	8.03	A. M.	9.34
Clinton	11.30	4.44	7.46	....	9.18
Warwick	11.25	4 37	7.37	....	9.12
*Marshallville	11.10	4.27*	7.23	....	9.00
Orrville	10.57	4.14	7.10 6.40 b	....	8.47
*Apple Creek	10.40	3.56*	6.22	....	8.27
Fredricksburg	10.26	3.43	6.08	....	8.13
*Holmesville	10 16	3.33*	5.58	Accom	8.02
Millersburg	10.05	3.22	5.45	7.50	
			A. M.	P. M.	P.M.
Millersburg	10 05	3.22	....	8.35	7.25
*Killbuck	9 51	3.08*	....	8.23	7.13
*Black Creek	9.39	2.57*	....	8.11	7.00
Gann	9.17	2.36	....	7.49	6 38
Danville	9.07	2.27	....	7.39	6.25
Howard	8.58	2.18	....	7.29	6.14
Gambier	8.49	2 09	....	7.14	6 03
Mt. Vernon	8.37	1.57	....	7.02	5.51
*Bangs	8.22	1.40*	....	6.46*	5.37
*Mt. Liberty	8.14	1.31*	....	6.37	5.28
Centerburg	8.05	1.22	....	6.28	5.17
*Condit	7.51	1.09*	....	6.14	5.03
*Sunbury	7.42	1.01*	....	6.06	4.53
*Galena	7.37	12 56*	....	6.00	4 47
Westerville	7.20	12 40	....	5.43	4 30
Leave Columbus	6.55	12.15	....	5.15	4.00
	A. M	P.M		P. M.	P.M.

* Stop on signal. B Breakfast. S Supper.

Special Round trip rates will be made for Sunday trains.

The Blue Grass Route of Ohio (Mt. Vernon line) will abandon their regular Sunday trains after September 10th, 1882

N. MONSARRAT, Gen'l Supt. Akron, O

E. T. AFFLECK, General Passenger Ag't, Columbus, O.

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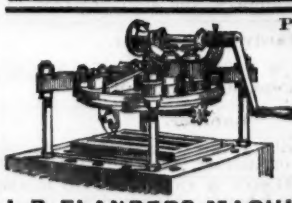

Patent Portable Valve Seat

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Descriptive Circular on application.

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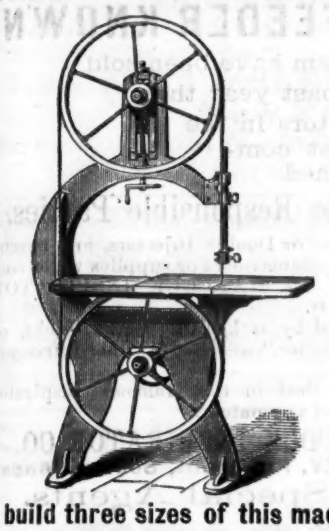

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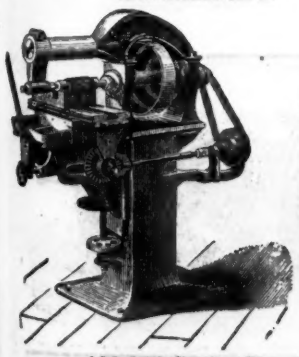

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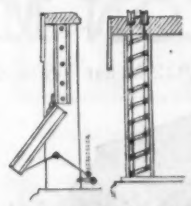
Patent For Sale or Divided.



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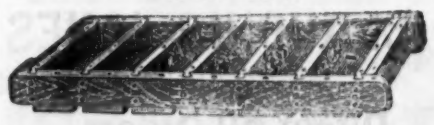

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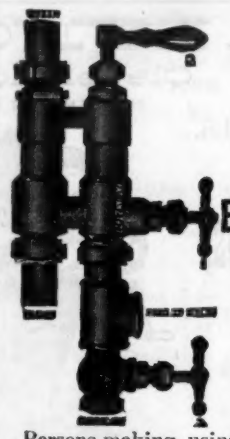

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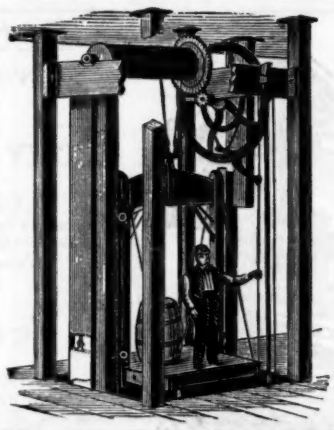
On the 23d of June a suit in chancery was commenced by it against James Jenks, of Detroit, Mich., for making and selling the "Duplex Injector," so-called. Other infringers will be promptly sued.

The Inspirator Company will defend all who use or deal in the Hancock Inspirator against any suits which allege it to be an infringement of any patent.

THE HANCOCK INSPIRATOR CO.
H. M. WHITNEY, President, Boston, Mass.

Fairbanks, Morse & Co., Special Agents.
CLEVELAND, OHIO.



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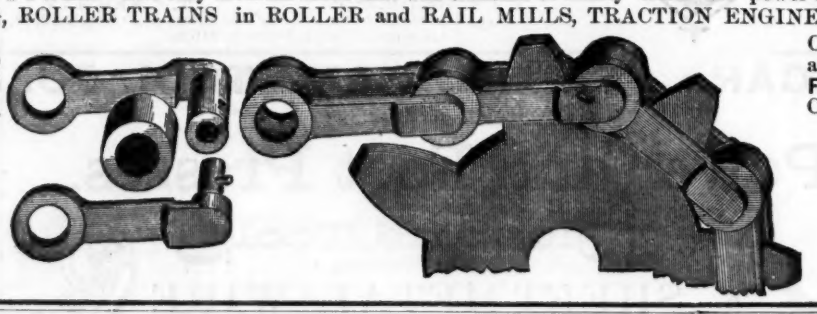

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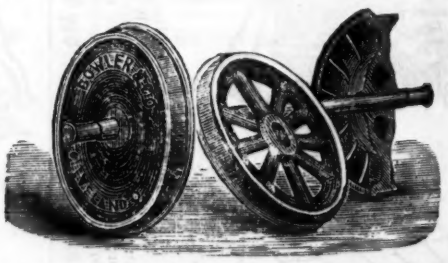

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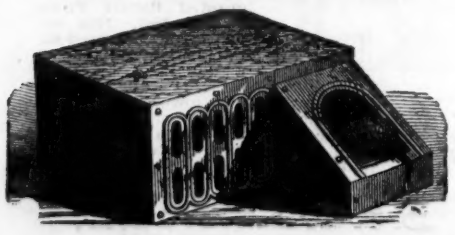

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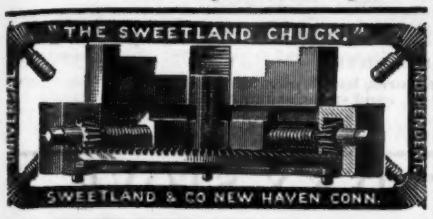

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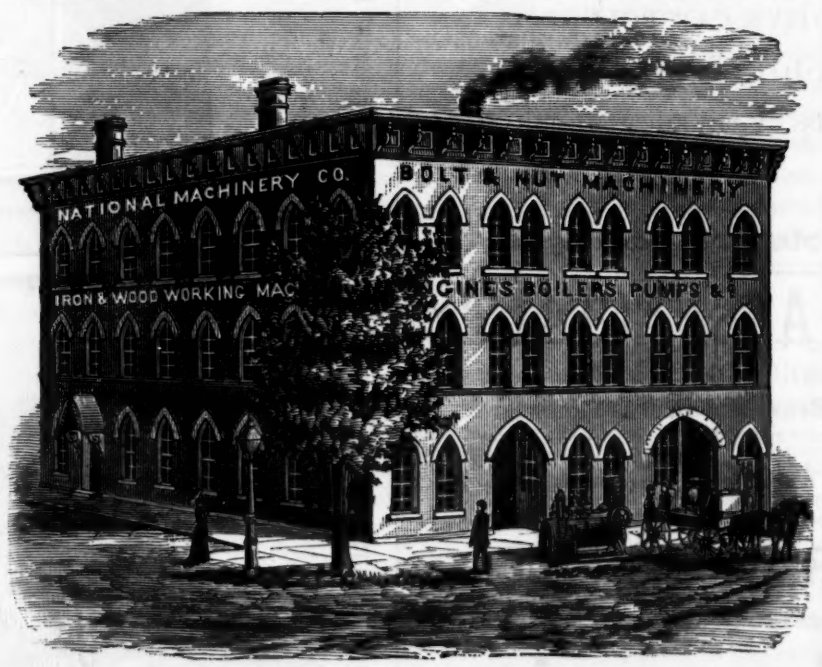

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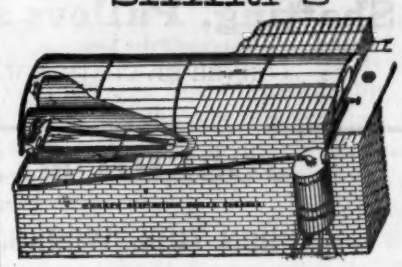

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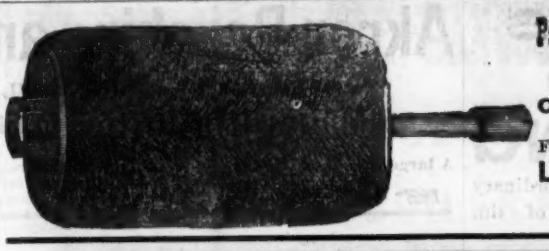
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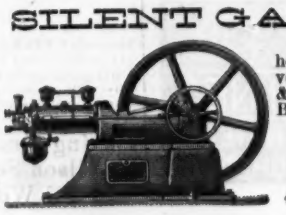
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